ARQUIVOS

DO

MUSEU NACIONAL

Nunquam aliud natura, aliud sapientia dicit
J. 14, 321

In silvis academi quœrere rerum,
Quamquam Socraticis madet sermonibus
Ladisl. Netto, ex Hor

Vol. XLI

1948
IMPRENSA NACIONAL
RIO DE JANEIRO — BRASIL

ARQUIVOS
DO
MUSEU NACIONAL

RIO DE JANEIRO

ARQUIVOS

DO

MUSEU NACIONAL

Nunquam aliud natura, aliud sapientia dicit
J. 14, 321

In silvis academi quœrere rerum,
Quamquam Socraticis madet sermonibus
Ladisl. Netto, ex Hor

Vol. XLI

1948
IMPRENSA NACIONAL
RIO DE JANEIRO — BRASIL

SUMÁRIO

CONTRIBUIÇÃO AO CONHECIMENTO DO GÊNERO *HENIARTES* SPINOLA, 1837

(APIOMERINAE, REDUVIIDAE, HEMIPTERA)

Por

PETR WYGODZINSKY

Entregue para publicação em 5 de março de 1946.
Distribuído em 28 de março de 1947.

CONTRIBUIÇÃO AO CONHECIMENTO DO GÊNERO *HENIARTES* SPINOLA, 1837

(APIOMERINAE, REDUVIIDAE, HEMIPTERA)

(Com 216 figuras)

PETR WYGODZINSKY

Instituto de Ecologia e Experimentação Agrícola — Rio de Janeiro, D. F.

Para Irmgard

There has been no greater retarding factor in systematic entomology than that of grafting supplementary work here and there upon the old, of using the characters and methods that have been used instead of seeking something of greater significance. Each new piece of synoptic work should penetrate as much as possible, judiciously noting and using, but neither copying nor worshipping previous contributions to the study.

McAtee & Malloch, *Revision of the American bugs of the Reduviid subfamily Ploiariinae.*

O presente trabalho não representa uma revisão ou monografia do gênero *Heniartes*. Para isso, nos falta a possibilidade de obter dados sôbre os tipos de tôdas as espécies anteriormente descritas. Pode o leitor estranhar o fato de têrmos assim mesmo considerado provisòriamente como identificadas algumas das espécies antigas, e rejeitado várias outras. Hoje em dia, os especialistas em vários ramos da zoologia descritiva não identificam animais descritos, se não puderem dispôr de monografia moderna ou dos próprios tipos; a descrição original, geralmente, não é considerada como tendo muito valor. Em certos casos, porém, como por exemplo no presente, não achamos razoável êste procedimento.

Tivemos ensejo de examinar 28 espécies diferentes de um gênero que continha, até então, apenas 6 descritas. Para não atrasar inùtilmente, ou mesmo paralisar o estudo dêste conjunto, achamos preferível identificar algumas das espécies com as já descritas, visto concordarem suficientemente os caracteres do material em mão com os dados publicados, aliás crítica e cuidadosamente examinados. Procedendo assim, deixamos o caminho livre para um estudo geral do interessante material reunido. A própria correção de eventuais erros de identificação, a ser feita mais tarde, ficará ainda facilitada à luz dos conhecimentos mais amplos que acabamos de adquirir sôbre o gênero *Heniartes*.

O presente caso nos obriga a algumas reflexões necessárias. Urge uma modificação radical nos métodos de trabalho na zoologia sistemática, e principalmente na entomologia. Uma grande parte da fauna atual ainda não é registrada; as possibilidades técnicas dos nossos dias permitiriam um aceleramento decisivo da execução desta tarefa básica, tão essencial para o progresso das ciências biológicas. A atual dispersão dos técnicos, das coleções e das bibliotecas em si não dificultaria grandemente o trabalho; são as dificuldades de comunicação entre êles, que entram decisivamente em jôgo. As máquinas e invenções tecnológicas modernas são perfeitamente capacitadas para remover qualquer problema técnico ou de comunicação que possa surgir durante uma dada investigação científica; na época do microfilme e do rapidíssimo correio aéreo não deviam mais surgir impossibilidades de ordem puramente técnica. O que, porém, pràticamente impossibilita ainda o uso das possibilidades quase ilimitadas que poderiam estar ao nosso serviço, é o próprio homem; ainda não se estabeleceu definitivamente o lema de o homem pensar no outro homem, pensar no modo de ajudar e colaborar, não para dificultar ou destruir, mas para edificar. Ainda não decidimos se vamos usar a ciência para nos servir, ou para barrar definitivamente o progresso humano.

Queremos deixar aqui registrados os nossos agradecimentos aos que por vários modos facilitaram o nosso trabalho, principalmente os seguintes colegas: William Beebe, New York; Max Birabén, La Plata; S. C. Bruner, Santiago de las Vegas; Padre P. Buck, Pôrto Alegre; José de Carlo, Buenos

Aires; José Cândido de Melo Carvalho, Rio de Janeiro; A. da Costa Lima, Rio de Janeiro; Henry Dietrich, Ithaca; Carl Drake, Ames; D. C. Geijskes, Paramaribo; Frederico Lane, São Paulo; Herman Lent, Rio de Janeiro; René Malaise, Stockholm; Oscar Monte, São Paulo; Padre J. Moure, Curitiba; P. A. Readio, Ithaca; Reece Sailer, Washington, D. C.; Newton Santos, Rio de Janeiro; Otto Schubart, Pirassununga; Aristóteles Silva, Rio de Janeiro. Agradecemos também ao Dr. Dario Mendes, chefe do laboratório onde foi executado o presente trabalho, e que sempre fêz tudo ao seu alcance para nos facilitar a nossa tarefa. Finalmente, agradecemos ao Sr. Antônio de Lemos Pereira por três desenhos, e ao Senhor José Domingues dos Santos pelas fotografias que acompanham as nossas notas.

Para designar as coleções onde está guardado definitivamente o material enumerado aqui, usaremos as seguintes abreviações:

U. S. N. M. . . . United States National Museum, Washington, D. C.

Cornell . . . . . Entomological Collections of the Agricultural Experiment Station of the Cornell University, Ithaca, N. Y.

I. E. E. A. . . . . Instituto de Ecologia e Experimentação Agrícola, Rio de Janeiro, D. F.

E. N. A. . . . . Escola Nacional de Agronomia, Rio de Janeiro, D. F.

I. O. C., Lent. . Instituto Oswaldo Cruz, Rio de Janeiro, D. F., aos cuidados do Dr. Herman Lent.

I. O. C., Lima . Instituto Oswaldo Cruz, Rio de Janeiro, aos cuidados do Prof. A. da Costa Lima.

Mus. Nac. . . . . Museu Nacional, Rio de Janeiro, D. F.

Dep. Zool. . . . . Departamento de Zoologia da Secretaria de Agricultura, São Paulo.

Inst. Biol. . . . . Instituto Biológico, S. Paulo.

Mus. Holm. . . . Naturhistoriska Riksmuseum Stockholm.

PARTE HISTÓRICA

Até hoje, as seguintes "espécies" têm sido enumeradas como pertencendo ao gênero *Heniartes*, errôneamente ou não:

Heniartes annulatus Spinola, 1837.
Reduvius coccineus Perty, 1834.
Heniartes curvipes Signoret, 1862.
Heniartes erythromerus Spinola, 1837.
Reduvius flavicans Fabricius, 1796.
Heniartes maestralis Fracker & Bruner, 1924.
Heniartes mayri Berg, 1884.
Heniartes productus Stal, 1866.
Reduvius serripes Fabricius, 1803.
Reduvius stollii Lepelletier & Serville, 1825.
Heniartes theresina Berg, 1879.
Apiomerus xanthophilus Walker, 1873.

Considerando-as uma por uma, chegamos às seguintes conclusões:

Heniartes annulatus. Acreditamos ter esta espécie em nosso material e fornecemos uma descrição detalhada.

Reduvius coccineus. Esta espécie é exclusivamente conhecida através da curta descrição original e das figuras que a acompanham. O tipo provàvelmente não existe mais, como se pode concluir da leitura do trabalho de HORN (1926). Queremos acreditar que em *coccineus* se trata de uma espécie de *Apiomerus*, e não de *Heniartes*, onde foi colocada provisòriamente por STAL (1872), que também não a conhecia. Achamos justificado não considerá-la mais em nosso trabalho.

Heniartes curvipes pertence ao gênero *Agriocoris* Stal, 1868, segundo STAL (1866, 1872).

Heniartes erythromerus. Examinamos numerosos exemplares de *Heniartes*, que consideramos como pertencentes a esta espécie. Será redescrita como genótipo, desde que a escolha do mesmo ainda não foi efetuada, segundo nos consta.

Reduvius flavicans. Várias vêzes identificada pelos autores, também possuimos a espécie, redescrevendo-a.

Heniartes maestralis. Uma boa espécie, que, dada a gentileza de BRUNER, pudemos examinar pessoalmente.

Heniartes mayri. Consideramos esta espécie como sinônima de *erythromerus* Spinola, como explicamos adiante.

Heniartes productus. Examinamos o tipo da espécie.

Reduvius serripes. Aceitamos provisòriamente os dizeres de STAL (1868), que coloca a espécie na sinonímia de *Heniartes flavicans*.

Reduvius stollii. A espécie é considerada por todos os autores como sinônimo de *flavicans;* mantemos esta sinonímia.

Heniartes theresina não pertence à subfamília *Apiomerinae*. Isto provam as fotografias do tipo (figs. 213 e 214), postas gentilmente à nossa disposição pelo Prof. Dr. MAX BIRABÉN, Chefe do Departamento dos Invertebrados do Museu de La Plata, onde o tipo está guardado. Também examinamos um espécimen, que inteiramente corresponde à descrição e às fotografias. Trata-se indubitàvelmente de uma espécie da subfamília *Harpactorinae* do gênero *Pyrrhosphodrus* Stal.

Apiomerus xanthophilus Walker foi considerado por DISTANT (1903) como sinônimo de *Heniartes productus*. Queremos, porém, esperar novo exame do tipo, guardado no Museu Britânico, antes de considerar a questão como definitivamente resolvida.

Resumindo as considerações acima, chegamos à seguinte lista das espécies válidas ou ainda a serem reexaminadas:

Heniartes annulatus Spinola, 1837.
Heniartes erythromerus Spinola, 1837.
Heniartes flavicans (Fabricius, 1796).
Heniartes productus Stal, 1866.
Heniartes maestralis Fracker & Bruner, 1924.
Heniartes xanthophilus Walker, 1873.

Destas 6 espécies, uma (*xanthophilus*) é duvidosa, e a sua posição só poderá ser esclarecida depois do exame do respectivo tipo. As outras 5 espécies consideramos por nós identificadas. Damos abaixo redescrições das mesmas, descrevendo mais 23 espécies novas, que constam da seguinte enumeração, em ordem alfabética:

Heniartes australis n. sp.
Heniartes beebei n. sp.
Heniartes birabéni n. sp.
Heniartes cachabi n. sp.
Heniartes carvalhoi n. sp.
Heniartes chanchamayo n. sp.
Heniartes demerara n. sp.
Heniartes distinguendus n. sp.
Heniartes geijskesi n. sp.
Heniartes huacapistana n. sp.
Heniartes jaakkoi n. sp.
Heniartes lenti n. sp.
Heniartes lopesi n. sp.
Heniartes maracaibo n. sp.
Heniartes mendesi n. sp.
Heniartes nordestensis n. sp.
Heniartes putumayo n. sp.
Heniartes scutellatus n. sp.
Heniartes thoracicus n. sp.
Heniartes travassosi n. sp.
Heniartes triannulatus n. sp.
Heniartes tumatumari n. sp.
Heniartes zikáni, n. sp.

MORFOLOGIA

Passamos a descrever alguns aspectos da morfologia de *Heniartes*, especialmente os que nos parecem interessantes para fins taxonômicos.

A cabeça, de forma alongada muito característica, sofre poucas modificações nas diferentes espécies. Achamos útil considerar a relação do comprimento do olho, na vista dorsal, e do comprimento da região postocular, no mesmo aspecto. Em algumas espécies, o comprimento da parte postocular corresponde ao dobro do comprimento dos olhos, em outras espécies não atinge esta medida. Os olhos, geralmente de tamanho regular (figs. 1 e 2), são bem mais salientes e arredondados em *geijskesi* (figs. 87 e 88), e em menor grau também em *productus*. O rostro é de forma idêntica em tôdas as espécies; também o comprimento relativo dos seus segmentos não sofre modificações, de uma espécie para outra. As antenas não variam distintamente quanto à espessura dos seus artículos e o feitio dos seus pêlos, sempre mais curtos que o diâmetro do respectivo artículo. Os comprimentos relativos dos artículos, porém, fornecem excelentes caracteres taxonômicos, especialmente o comprimento relativo do 3.° artículo. (Vide a Tabela na pág. 14).

Esta tabela nos mostra os valores respectivos para tôdas as espécies, obedecendo a sua arrumação aos grupos naturais que existem no gênero. Como se vê, os valores obtidos se enquadram perfeitamente nestes grupos. O colorido geral da cabeça, do rostro e das antenas é preto ou píceo muito escuro, apenas em algumas espécies total ou parcialmente vermelho escuro. Na base do 2.° artículo do rostro se encontram muitas vêzes uma

região mais ou menos extensa, de colorido claro, que tem valor específico. A base do 3.º artículo das antenas possui em várias espécies um distinto anel esbranquiçado, também bom caráter específico; em *maestralis*, também a base do 4.º artículo é esbranquiçada.

Tabela dos comprimentos relativos dos artículos das antenas das espécies de Heniartes

ESPECIE	ART. I	ART. II	ART. III	ART. IV
jaakkoi	1	0.8	1.1–1.2	1.3–1.4
australis	1	0.7–0.8	1.0	1.1–1.3
lopesi	1	1.0	1.4	1.2
annulatus	1	0.8	1.0–1.3	1.1
triannulatus	1	0.8	1.0	1.2
crythromerus	1	0.7	0.7	1.0
birabéni	1	0.7	0.8	1.0
nordestensis	1	0.7	0.7	0.9–1.0
thoracicus	1	0.75	0.65	1.0
travassosi	1	0.6	0.5	0.8
maracaibo	1	0.7	0.8	?
tamatumari	1	0.7	1.0	1.1
mendesi	1	0.7	1.0	1.1
flavicans	1	0.7	1.0–1.1	1.3
geijskesi	1	0.7	1.1	?
scutellatus	1	0.55	1.0	?
lenti	1	0.6–0.7	1.0–1.1	1.2–1.3
beebei	1	0.7	1.1	1.1
maestralis	1	0.7	1.0	1.0
distinguendus	1	0.8	0.8	1.0
huacapistana	1	0.9	0.8	1.1
cachabi	1	0.8	0.9	?
chanchamayo	1	0.9	?	?
zikáni	1	0.7	1.2	1.2–1.3
carvalhoi	1	1.1	1.1	1.4
demerara	1	0.8	1.5	?

O pronoto fornece numerosos caracteres específicos de grande valor. A forma dos ângulos ântero-laterais do colarinho, arredondados ou mais ou menos aguçados, é muito constante dentro de uma dada espécie. O lobo anterior do pronoto é dividido em dois lóbulos por uma sutura longitudinal mediana; em algumas espécies, êstes lóbulos são bastante elevados, ou possuem um pequeno, mas distinto tubérculo apical; em *carvalhoi*, os lóbulos se prolongam em duas saliências cônicas muito altas, convergentes, e providas de numerosas cerdas (fig. 171). O lobo posterior do pronoto não ajuda na classificação; em muitas espécies se observa uma impressão central, cujo feitio, porém, é dificilmente definido. As cerdas do lobo anterior do pronoto são arrumadas em fileiras ou faixas, cuja composição, seja de muitas, seja de poucas cerdas, compridas ou curtas ou de ambas as condições, fornece caracteres específicos de primeira ordem; provam isso as figuras 44, 49, 51 e 197.

O escutelo mantém na maioria das espécies a sua simples forma triangular, com a crista longitudinal mediana pouco elevada. Em *H. productus* e *H. scutellatus* o escutelo é muito alongado posteriormente, (fig. 201); em *H. carvalhoi* e mais ainda em *zikáni* (figura 170), o escutelo possui um prolongamento apical subagudo, com a carena longitudinal mediana muito elevada.

As nervuras dos hemélitros e das asas são demonstradas nas figuras 3 e 4. Nas espécies da região amazônica, os hemélitros são muito compridos, distintamente lanceolados e ultrapassam bastante o ápice do abdomen; nas outras espécies, os hemélitros são mais curtos.

As pernas possuem muitos tipos de pêlos e cerdas, os quais, porém, por não apresentar caracteres específicos, não serão considerados aqui (fig. 77). A tíbia anterior apresenta um certo interêsse para a classificação; na maioria das espécies, ela é fortemente comprimida; em *tumatumari* e nos grupos *flavicans* e *zikáni*, ela é apenas ligeiramente comprimida; em *maestralis* e no grupo *distinguendus*, ela é inteiramente roliça. A tíbia mediana, geralmente curvada fortemente, é quase reta em *thoracicus*, distinguindo-se a espécie dêste modo de *travassosi*, que lhe está muito próxima. O colorido das pernas fornece caracteres muito importantes para a classificação das espécies, como provém da leitura da nossa chave.

Também o colorido do abdomen fornece em alguns casos caracteres específicos. Os caracteres mais importantes, porém, nos apresentam as partes genitais em ambos os sexos.

A região genital da fêmea de *Heniartes* se compõe de vários escleritos, que passamos a descrever. O 7.º esternito é muito grande, maior do que os outros, e possui na sua região central uma saliência mais ou menos distinta, coberta de numerosas cerdas longas (figs. 8 e 9). O 8.º esternito é representado por dois lobos, que possuem no seu bordo posterior uma fileira irregular de cerdas espiniformes fortes, bem pigmentadas, cujo feitio varia segundo a espécie. O disco do lobo do 8.º esternito é provido de algumas macroquetas longas e fortes, pêlos regulares de tamanho e número variável, e, no grupo *flavicans*, numerosas microquetas muito curtas (fig. 78). Na margem dêstes lobos se inserem as gonapófises anteriores, de forma subtriangular, com pêlos mais ou menos numerosos no disco, e um grupo apical de cerdas fortes, que na maioria das espécies formam apenas um pequeno tufo apical (fig. 10); em *maestralis*

(fig. 152) e nos grupos *zikáni* e *distinguendus*, estas cerdas ocupam uma área bem grande. No ângulo basal interno das gonapófises anteriores, liso nas fêmeas examinadas dos grupos *flavicans* (fig. 78) e *zikáni*, e também em *H. maracaibo* e *H. maestralis*, se encontra um grupo de macroquetas, pouco numerosas no grupo *jaakkoi* (fig. 10), muito numerosas no grupo *erythromerus* (fig. 36). As gonapófises medianas, em forma de escleritos subtriangulares muito pouco esclerosados e sem cerdas, em geral são cobertas pelas gonapófises anteriores, mas se ligam, por finas membranas, às gonapófises posteriores (fig. 11). Estas, ligadas no meio, formam um esclerito só. Na maioria das espécies (isto é, tôdas as fêmeas examinadas dos grupos *jaakkoi* (figura 11) e *erythromerus*, assim como também em *tumatumari*), êste conjunto de escleritos é dotado de 2+2 grupos curtos de cerdas espiniformes fortes e curtas; nas fêmeas examinadas do grupo *flavicans* (fig. 79) existem apenas 1+1 grupos, porém bastante alongados; nos grupos *zikáni* (fig. 162) e *distinguendus* e em *H. maestralis*, a forma do conjunto, subarredondado nos outros grupos, é subtriangular; as cerdas, espiniformes são arrumadas em 1+1 grupos alongados, em cujas extremidades se acham cerdas mais compridas, e em cujo meio existem cerdas bem curtas e pouco numerosas. Êste conjunto de gonapófises é protegido por trás pelo esclerito (figura 8) formado pela fusão do 9.° e 10.° tergito, resultando uma peça de forma subtrapezoidal, ligeiramente escavada posteriormente, geralmente bastante longa (fig. 12), apenas em *H. maestralis* e nos grupos *zikáni* e *distinguendus* muito curta (fig. 163). A posição dêste esclerito é quase vertical; o seu disco possui macroquetas mais ou menos numerosas, o seu bordo posterior e os seus ângulos póstero-laterais possuem pêlos mais finos em grande quantidade.

A genitália do macho provou ser de excepcional utilidade para a taxonomia do gênero. O hipopígio, bastante grande e saliente, alojado, quando em repouso, juntamente com o diminuto 8.° esternito, numa escavação do 7.° esternito (figs. 13 e 14), termina numa saliência apical mais ou menos distinta, que por sua vez possui 1+1 processos distais. O feitio dêstes processos é característico para as diferentes espécies. Também o colorido do hipopígio pode fornecer caracteres específicos. Apresentamos para a maioria das espécies duas figuras do aspecto externo do hipopígio, uma da vista lateral (fig. 14), a outra do aspecto ventral (fig. 13). Em alguns casos, completamos estas figuras com um desenho que mostra os processos apicais com maior aumento, indicando também os pêlos e as cerdas que aí existem (fig. 17). O feitio dos clásperes fornece igualmente muito bons caracteres específicos, como mostram as respectivas figuras. Em geral, os clásperes são mais ou menos retos, fortemente curvos apenas na parte apical (fig. 18); nos grupos *zikáni*, *distinguendus* e em *H. maestralis*, o clásper tem aproximadamente a forma de uma foice (figura 133). A distribuição, o número e a forma das cerdas da face ventral do clásper variam grandemente de uma espécie para a outra, mas são muito constantes dentro de uma unidade taxonômica. O próprio aedeagus é composto de um esclerito basal (basal plates), que o articula com o hipopígio, e um saco delicado (phallosoma), que possui vários processos pares ou ímpares, mais ou menos fortemente esclerosados, que são de suma importância para a caracterização das espécies. Para a conveniência do leitor juntamos letras nas figuras dos aedeagus de *Heniartes*, indicando as denominações dos processos considerados em nossas descrições. Em certos casos, mormente quando se trata de exemplares mal conservados, o aedeagus do macho fornece os únicos caracteres seguros para a classificação exata. — Para comprovar o valor dos caracteres da genitália do macho, examinamos em várias espécies representadas em nosso material por numerosos exemplares (*annulatus*, *erythromerus*, *flavicans* e *jaakkoi*) espécimens de tôdas as proveniências representadas, e também, em outros casos, vários insetos da mesma localidade; observamos uma variabilidade muito pequena, que se mantém perfeitamente dentro dos limites por nós considerados.

O exame e os desenhos do aedeagus foram feitos com material tratado prèviamente pela potassa e examinado em fenol.

SISTEMÁTICA

Gen. *Heniartes* Spinola, 1837

Trichoscelis Amyot & Serville, 1843.

Cabeça alongada, do comprimento do pronoto ou mais longa, ligeiramente curva na

vista lateral, a parte postocular mais comprida que a anteocular. Antenas compridas, atingindo o comprimento do corpo, bastante fortes, o primeiro artículo ultrapassando consideràvelmente o ápice da cabeça.

Colarinho com os ângulos ântero-laterais distintamente salientes. Sulco longitudinal mediano do lobo anterior do pronoto atingindo o sulco transversal que separa o lobo anterior do posterior. Escutelo triangular, subagudo, com crista longitudinal mediana na parte posterior. Pernas delicadas, os fêmures anteriores da grossura dos medianos e posteriores; tíbias anteriores sem sulcos distintos para a recepção dos tarsos; tarsos anteriores de 2, medianos e posteriores de 3 artículos.

Cório simples, sem áreas de secreção de cêra. Membrana uniformemente escura.

Genótipo: *Heniartes erythromerus* Spinola, 1837.

Pelos caracteres acima mencionados, o gênero se distancia bastante da maioria dos gêneros da subfamília. Apenas um único, *Agriocleptes* Stal, 1866, lhe tem certas afinidades. Êste, porém, difere pela cabeça sempre mais comprida do que o pronoto, pela presença de áreas de secreção de cêra no cório, e pela membrana, que não é uniformemente escura, mas possui áreas mais claras, semi-hialinas.

CHAVE PRÁTICA PARA A DETERMINAÇÃO DAS ESPÉCIES DO GÊNERO *HENIARTES* SPINOLA

1. Pronoto preto, com 1+1 manchas claras circulares na parte anterior do lobo posterior (figura 208) ..... *maestralis* Fr. & Br.
— Pronoto de colorido diferente 2
2. Ápice do cório de côr preta, como a membrana (figs. 198-201) 3
— Ápice do cório de côr clara, como o resto do cório (fig. 186) 7
3. A metade ou os 2/3 basais dos fêmures de colorido uniformemente escuro (fig. 199) ..... *geijskesi n. sp.*
— Região basal dos fêmures de côr clara (figura 198) 4
4. Escutelo de forma usual, subtriangular (figura 198) 5
— Escutelo excessivamente prolongado apicalmente (fig. 201) .....4a.
4a. Prolongamento do escutelo comprimido no sentido dorso-ventral, estreito na base, alargado subapicalmente; relação do comprimento dos três primeiros artículos da antena = 1 :0,5:1,0 ..... *scutellatus* n. sp.
— Prolongamento do escutelo comprimido no sentido lateral; relação dos três primeiros artículos da antena = 1 :0,65:1,1 ..... *productus* Stal.
5. Lobo posterior do pronoto com as cerdas em número regular (fig. 76); genitália do macho conforme figs. 80-86 6
— Lobo posterior do pronoto com as cerdas extraordinàriamente numerosas (fig. 111); genitália do macho conforme figs. 112-116 ..... *demerara* n. sp.
6. Ângulos ântero-laterais do colarinho com uma área de cerdas curtas e numerosas (fig. 76) ..... *flavicans* (F.)
— Ângulos ântero-laterais do colarinho apenas com longas cerdas isoladas ... *putumayo* n. sp.
7. Fêmures de colorido escuro uniforme, sem vestígios de regiões mais claras (figs. 192-194); o terceiro artículo das antenas sempre mais curto que o primeiro 8
— Fêmures com 1 ou vários anéis claros: às vêzes (*cachabi*) distintos apenas no par posterior; terceiro artículo das antenas de comprimento relativo variado 10
8. Regiões claras e escuras do cório nitidamente separadas; pronoto uniformemente vermelho ..... *nordestensis* n. sp.
— Regiões claras e escuras do cório confluentes: lobo posterior do pronoto distintamente mais escuro que o anterior 9
9. Espécie grande (fêmea 19 mm): lobo posterior do pronoto e fêmures de côr preta; tíbia do 2º par quase reta (fig. 193) .... *thoracicus* n. sp.
— Espécie pequena (fêmea 15 mm); lobo posterior do pronoto e fêmures de côr vermelha escura; tíbia do 2º par fortemente curva, como usual (fig. 194) ..... *travassosi* n. sp.
10. Base dos fêmures de côr vermelha, os 4/5 restantes uniformemente pretos (fig. 191) ..... *birabéni* n. sp.
— Fêmures de colorido diferente 11
11. Fêmures de colorido preto ou castanho, com ou sem anel claro basal, e com um único anel claro submediano ou subapical (fig. 186) ..12
— Fêmures de colorido preto, castanho ou avermelhado, sempre com mais do que um anel claro além do basal (figs. 188, 196, 209) ...20
12. Tíbia anterior distintamente comprimida no sentido lateral, muitas vêzes coberta de secreção viscosa 13
— Tíbia anterior muito delicada, roliça em todo o seu comprimento, nunca coberta de secreção viscosa 17
13. Lobo posterior do pronoto vermelho na parte anterior, e com uma larga faixa preta na sua parte posterior, sendo esta faixa nitidamente separada da região clara; cório preto, com mancha posterior amarela, nitidamente delimitada (fig. 195) ..... *maracaibo* n. sp.
— Lobo posterior do pronoto de colorido uniformemente amarelado ou avermelhado, às vêzes ligeiramente escurecido secundàriamente, neste caso as regiões claras e escuras confluentes; cório de colorido avermelhado mais ou menos uniforme, as regiões claras e escuras confluentes 14

14. Espécie de corpo alongado e hemélitros lanceolados, do feitio de *flavicans* (fig. 203), os hemélitros ultrapassando o ápice do abdômen por mais do que 1 mm; espécie da região amazônica .....*beebei* n. sp. (veja nº 25)
— Espécie de corpo mais curto (fig. 186), com os hemélitros menos alongados, não ultrapassando o ápice do abdômen por mais do que 1 mm; espécies do sul do Brasil 15
15. Base da tíbia posterior sem anel preto distinto; rostro inteiramente preto .....*lopesi* n. sp.
— Base da tíbia posterior com distinto anel preto; base do 2º artículo do rostro com colorido claro 16
16. Processos apicais do hipopígio do macho relativamente curtos, divergentes (fig. 13); hipopígio de colorido avermelhado uniforme; comprimento da fêmea 15.0-16.0, do macho 13.0--15.0 mm .....*jaakkoi* n. sp.
— Processos apicais do hipopígio do macho relativamente compridos, subparalelos (fig. 23); hipopígio avermelhado, com 1+1 faixas medianas longitudinais escuras; comprimento da fêmea 17.0-18.0, do macho 16.0-16.5 mm .....*australis* n. sp.
17. Anel claro dos fêmures pouco distinto, quase indistinguível no par anterior e mediano (figura 207); pronoto uniformemente vermelho, preta apenas uma fina linha que acompanha o bordo posterior, entre os ângulos umerais; ângulos ântero-laterais do colarinho pouco salientes (fig. 138) .....*cachabi* n. sp.
— Anel claro dos fêmures muito distinto em todos os pares (figs. 204-206); pronoto de colorido diferente; ângulos ântero-laterais do colarinho bastante salientes (figs. 117, 128) 18
18. Ângulos ântero-laterais do colarinho prolongados em processos agudos, dirigidos para a frente (fig. 128); áreas escuras do lobo anterior e posterior do pronoto ligadas entre si (fig. 205) .....*huacapistana* n. sp.
— Ângulos ântero-laterais do colarinho arredondados, dirigidos para o lado (figs. 117, 148); área escura do lobo anterior do pronoto nitidamente separada da do lobo posterior 19
19. Hemélitros curtos, truncados apicalmente; lóbulos do lobo anterior do pronoto com pequenos tubérculos apicais (fig. 204) .....*distinguendus* n. sp.
— Hemélitros bastante alongados; lóbulos do lobo anterior do pronoto sem tubérculos apicais (fig. 206) .....*chanchamayo* n. sp.
20. Fêmures com mais de 3 anéis claros (figs. 209, 210) 21
— Fêmures com 3 anéis claros (figs. 188, 196) 22
21. Lobo anterior do pronoto com duas saliências cônicas muito altas, cobertas de numerosas cerdas; escutelo de forma regular (fig. 171) .....*carvalhoi* n. sp.
— Lobo anterior do pronoto com os lóbulos elevados, mas sem saliências cônicas; ápice do escutelo extraordinàriamente prolongado e ligeiramente dirigido para cima (fig. 170) .....*zikáni* n. sp.
22. Côr básica dos fêmures e base da tíbia preta; os fêmures com 1 anel claro basal, nem sempre bem distinto, e dois subapicais, bem delimitados (fig. 188) .....*triannulatus* n. sp.
— Côr básica dos fêmures castanha ou avermelhada, base da tíbia nunca preta (fig. 196) 23
23. Espécies de forma bastante alongada e estreita, com os hemélitros lanceolados, do feitio de *flavicans* (fig. 196); lóbulos do lobo anterior do pronoto sem tubérculos apicais; espécies da região amazônica 24
— Espécies de forma mais curta e grossa (figuras 188, 190); lóbulos do lobo anterior do pronoto com distinto tubérculo apical (fig. 30); espécies do Sul do Brasil, do Paraguai, da Bolívia e do Norte da Argentina 27
24. Faixas longitudinais submedianas posteriores do lobo anterior do pronoto compostas de numerosíssimos pêlos muito curtos, além de cerdas compridas (fig. 197); ângulos ântero-laterais do colarinho com pequeno tubérculo apical .....*tumatumari* n. sp.
— Faixas longitudinais submedianas posteriores do lobo anterior do pronoto compostas apenas de cerdas compridas menos numerosas (figura 92); ângulos ântero-laterais do colarinho arredondados, simples ou com pequeno tubérculo apical 25
25. Anel claro subapical dos fêmures muito menos distinto do que o submediano (fig. 203); genitália do macho como nas figs. 104-110 .....*beebei* n. sp. (veja nº 14)
— Anel claro subapical dos fêmures tão distinto como o submediano (fig. 202); genitália do macho diferente 26
26. Ângulos ântero-laterais do colarinho largamente arredondados, área de pêlos curtos presente; genitália do macho como nas figs. 96--101 .....*lenti* n. sp.
— Ângulos ântero-laterais do colarinho com distinto tubérculo subapical, área de pequenos pêlos ausente; genitália do macho conforme figs. 72-73 .....*mendesi* n. sp.
27. Antenas de colorido preto uniforme; 3º artículo mais curto que o 1º; o abdômen muito largo, com os bordos laterais quase paralelos (figura 189); ângulo basal interno das gonapófises anteriores da fêmea com um tufo composto de macroquetas muito numerosas (figura 36) .....*erythromerus* Spinola
— 3º artículo das antenas com distinto anel basal esbranquiçados; êste artículo tão ou mais comprido que o 1º; abdômen mais estreito, os bordos laterais distintamente convergentes para trás (fig. 190); ângulo basal interno das gonapófises anteriores da fêmea com poucas macroquetas (fig. 35) .....*annulatus* n. sp.

Publicamos a seguir um esquema do arranjo sistemático das espécies no intuito de demonstrar as relações filogenéticas das espécies do gênero, visto ser a chave acima apresentada por maior parte artificial.

ARRANJO SISTEMÁTICO DAS ESPÉCIES
(ESQUEMA)

Conjunto do 9º e 10º tergitos das fêmeas bastante comprido: cerdas apicais das gonapófises anteriores formando apenas um pequeno tufo apical: conjunto das gonapófises posteriores de forma subarredondada, as suas cerdas muito curtas. espiniformes, arrumadas em 1+1 grupos alongados, ou 2+2 grupos curtos, não ligados entre si: clásper do macho quase reto, curvo apenas apicalmente.

Hemélitros curtos, não lanceolados.

Ângulo basal interno das gonapófises anteriores da fêmea com um grupo de macroquetas mais ou menos numerosas; lobo posterior do pronoto de colorido uniforme.

3º artículo das antenas tão ou mais comprido que o 1º; grupo do ângulo basal da gonapófise anterior da fêmea composto de menos de 10 macroquetas

jaakkoi
? *annulatus*
lopesi
australis
triannulatus

3º artículo das antenas distintamente mais curto que o 1º; grupo do ângulo basal interno das gonapófises anteriores da fêmea composto de mais de 10 macroquetas

erythromerus
birabéni
nordestensis
thoracicus
travassosi

Ângulo basal interno das gonapófises anteriores da fêmea liso: parte posterior do lobo posterior do pronoto preta, a parte anterior dêste lobo avermelhada

maracaibo

Hemélitros alongados, lanceolados.

Aedeagus do macho com placa ventral; lobos do 8º esternito da fêmea sem microquetas; ângulo basal interno das gonapófises anteriores com grupo de macroquetas; conjunto das gonapófises posteriores com 2+2 grupos de cerdas espiniformes

tumatumari
mendesi

Aedeagus do macho sem placa ventral; lobos do 8º esternito da fêmea com microquetas; ângulo basal interno das gonapófises anteriores liso: conjunto das gonapófises posteriores com 1+1 grupos alongados de cerdas espiniformes.

Processo terminal lateral superior do aedeagus do macho bilobado, o inferior simples

flavicans
putumayo
geijskesi
productus
lenti
beebei

Processo terminal lateral superior do aedeagus simples, o processo terminal lateral inferior ausente

demerara

Conjunto do 9º e 10º tergitos da fêmea muito curto e largo: cerdas apicais das gonapófises anteriores ocupando uma região relativamente grande; conjunto das gonapófises posteriores de forma subtriangular, as suas cerdas bastante longas, arrumadas em 2+2 grupos ligados por uma fileira irregular de cerdas muito curtas; clásper do macho em forma de foice

3º artículo das antenas tão comprido ou mais curto que o 1º; tibias anteriores inteiramente roliças; fêmures totalmente pretos, ou com um único anel claro

Base do 3º e do 4º artículos das antenas com anel claro: fêmures inteiramente prêtos

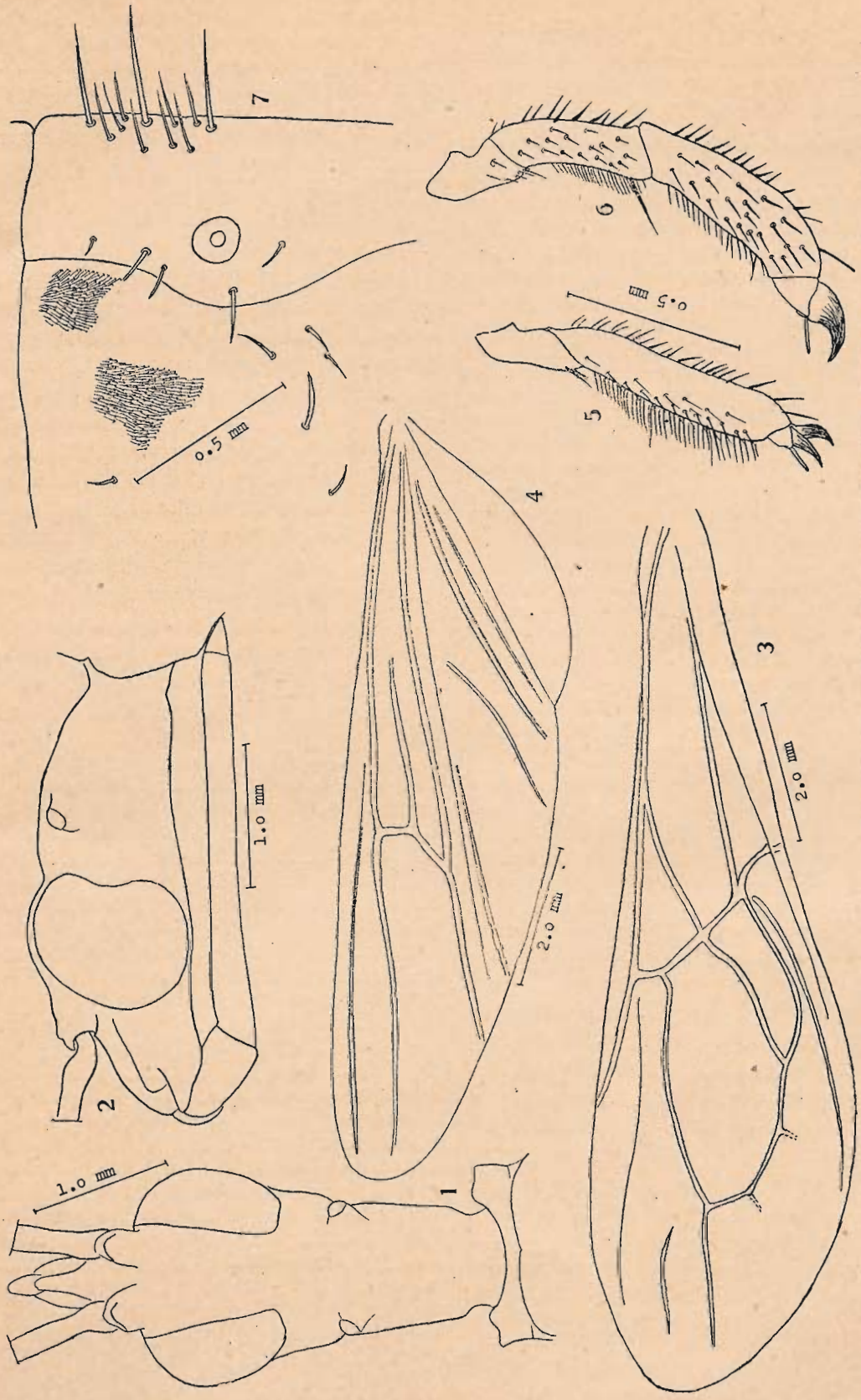
maestralis

Antenas inteiramente prêtas; fêmures com anel claro mais ou menos distinto

distinguendus
huacapistana
cachabi
chanchamayo

3º artículo das antenas mais comprido que o 1º; tibias anteriores comprimidas; fêmures com numerosos anéis claros e escuros

zikáni
carvalhoi



Heniartes jaakkoi n. sp. — Fig. 1 Cabeça, aspecto dorsal. — Fig. 2 Cabeça, aspecto lateral. — Fig. 3. Esquema do hemélitro. — Fig. 4. Esquema da asa posterior. — Fig. 5. Tarso anterior. — Fig. 6. Tarso posterior. — Fig. 7. Parte lateral do 5º urosternito, com estigma, cerdas e pêlos — Wygodzinsky del.

Heniartes jaakkoi n. sp.

(figs. 1-21, 186)

Comprimento do corpo (até o ápice dos hemélitros) 15.0-16.0 mm na ♀, 13.0-15.0 mm no ♂; largura máxima do pronoto 4.5 mm na ♀, 3.5 mm no ♂; largura máxima do abdômen 3.5 mm na ♀, 3.0 mm no ♂. Forma geral relativamente estreita, conforme fig. 186.

Colorido: Todos os artículos da antena de colorido preto uniforme. Face ventral e lateral do têrço basal do 2º artículo do rostro amarelo-esbranquiçada. Pronoto vermelho-alaranjado bastante escuro; colarinho e uma mancha central do lobo anterior do pronoto pretos. Escutelo preto, com a porção apical da côr do pronoto. Pleura, esternos e coxas da côr do pronoto. Clavo castanho escuro; cório de colorido vermelho-alaranjado, mais escuro em frente, mais claro para trás. Pernas pretas ou castanhas muito escuras, com anéis amarelos ou alaranjados. Fêmur anterior com 1 estreito anel submediano, fêmures medianos e posteriores com 1 anel claro subbasal e 1 submediano, sendo o primeiro nem sempre bem distinto no fêmur mediano. Tíbia anterior e mediana com 1 estreito anel claro submediano; tíbia posterior com 1 largo anel claro, cujo comprimento, ligeiramente variável, corresponde mais ou menos a 1/3 do comprimento total do artículo. Face ventral do abdômen da côr do pronoto, ficando ligeiramente mais escuro para as regiões laterais dos esternitos. Conexivo manchado de amarelo e preto, ocupando as manchas pretas cêrca da metade da área total dos respectivos segmentos conexivais. Hipopígio do macho de colorido alaranjado uniforme, igual ao do resto dos esternitos.

Cabeça conforme figs. 1 e 2; parte anterior não muito larga; comprimento do espaço postocular, na vista dorsal, menos do que o dobro do comprimento de um olho, neste aspecto. Comprimento do 1º artículo da antena 3.0 mm na ♀, 2.5 mm no ♂; comprimentos relativos dos artículos = 1 : 0.7-0.8 : 1.1-1.2 : 1.3-1.4.

Ângulos ântero-laterais do colarinho pouco salientes. Lobo anterior do pronoto com os lóbulos moderadamente salientes, porém sem tubérculos distintos. Pêlos do pronoto relativamente curtos e fortes, pouco numerosos, os do lobo anterior arrumados em fileiras simples. Escutelo de forma regular, subagudo, posteriormente com distinta crista longitudinal mediana, pouco elevada.

Tíbia anterior ligeiramente curva, fortemente comprimida no sentido lateral, em todo o seu comprimento; tíbia mediana fortemente curva, ligeiramente comprimida em todo seu comprimento; tíbia posterior ligeiramente curva, fortemente comprimida na sua parte basal, nesta última região os pêlos muito finos, longos e numerosos.

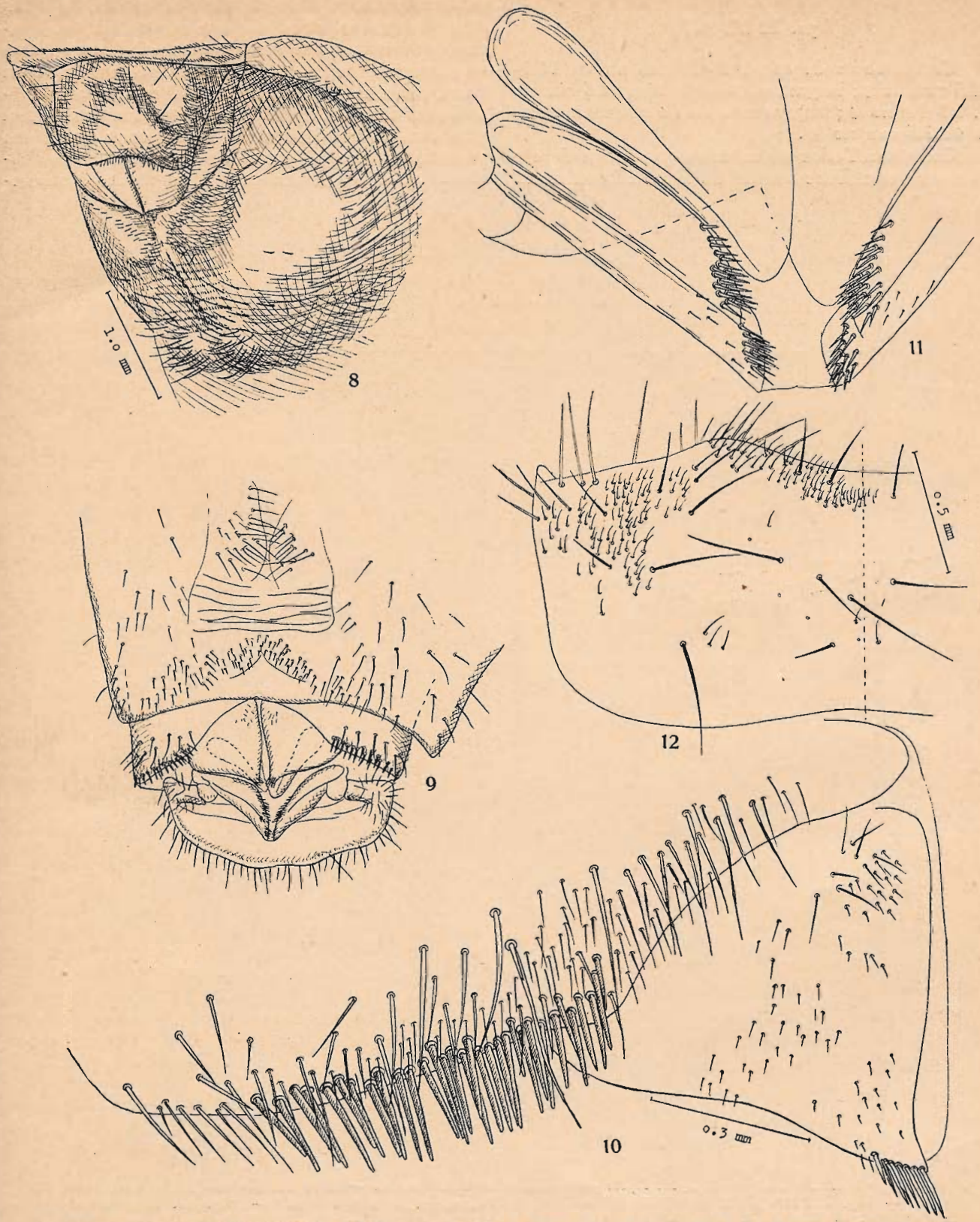
Hemélitros bastante longos e estreitos, ultrapassando o ápice do abdômen por mais do que 1 mm na ♀, e por um pouco menos do que 1 mm no ♂.

Genitália da ♀ conforme figs. 8-12. Cerdas espiniformes do bordo posterior dos lobos do 8º esternito muito numerosos, pêlos e macroquetas regulares. Cerdas espiniformes das gonapófises anteriores formando um pequeno tufo apical; disco com pêlos curtos em número regular; ângulo basal interno com algumas macroquetas (cêrca de 5). Conjunto das gonapófises posteriores de forma arredondada, as cerdas espiniformes formando 2+2 grupos. Conjunto do 9º e 10º tergito bastante longo, com macroquetas e pêlos conforme fig. 12; área central com poucos pêlos.

Genitália do macho conforme figs. 13-21. Hipopígio com a saliência apical curta, larga, processos apicais bastante afastados na sua base, curtos, divergentes, subtriangulares, subagudos. Clásperes conforme fig. 18; alongados, retos na sua parte basal, a parte apical relativamente estreita; pêlos da face interna delicados, pouco numerosos, de comprimento médio, isto é, não atingindo o comprimento do diâmetro do clásper. Aedeagus alongado, conforme figuras 19-21; processo dorsal (D) livre, isto é, o envólucro do falosoma não atingindo o seu ápice, êste último inclinado distintamente para trás; processos laterais basais (B) pouco distintos; placa ventral (V) destacada do envólucro, grande, sub-retangular, fortemente esclerosada; processos distais laterais superiores (S) distintamente esclerosados, processos distais laterais inferiores (I) hialinos.

Distribuição: Fazenda Penedo, Mun. Rezende, Estado do Rio de Janeiro, Brasil, 3-1942, 11-1942, 2-1943, 5-1943, Wygodzinsky col. (1 ♂ holótipo, 1 ♀ alótipo, I. E. E. A.: 1 ♂, 1 ♀ parátipos, col. autor; 1 ♂, 1 ♀ parátipos, U. S. N. M.; 1 ♂ parátipo, Mus. Nac.; 1 ♂ parátipo, British Museum); Itatiaia, Estado do Rio de Janeiro, Brasil, 700 m, 12-10-1942, Irmgard Burchard col. (1 ♀, col. autor); Itatiaia, Estado do Rio de Janeiro, Brasil, 700 m, 9-3-1934, 17-9-1942, 15-10-1942, W. Zikán col. (2 ♂♂, 1 ♀, I. E. E. A.); Itatiaia, Estado do Rio de Janeiro, Brasil, 700 m, 15-3-1934, 23-3-1935, 2-4-1942, 13-3-1944, 14-3-1944, 1-4-1944, 6-4-1944, J. F. Zikán col. (1 ♀, I. O. C. Lima; 1 ♂, 1 ♀, col. autor; 1 ♀, I. O. C. Lent; 1 ♂, Cornell, 1 ♂, 3 ♀♀, col. Zikán); São Paulo, Brasil, 7-1-1907, H. Luederwaldt col. (1 ♂, Dep. Zool.); Bananal, Serra da Bocaina, Estado de São Paulo, Brasil, 1-1927, D. Mendes col. (1 ♂, I. E. E. A.); Pinheiro, Estado do Rio de Janeiro, Brasil (1 ♂, E. N. A.); Japuíba, Angra dos Reis, Estado do Rio de Janeiro, Brasil, 23-3-1940, J. Lane & Hugo de Souza Lopes col. (1 ♂, I. O. C. Lent); Japuíba, Angra dos Reis, Estado do Rio de Janeiro, Brasil, 2-1944, Wygodzinsky col. (col. autor); Angra dos Reis, Estado do Rio de Janeiro, Brasil ,8-1932, 12-1932, 8-1934, L. Travassos col. (1 ♂, 1 ♀, I. O. C. Lima; 1 ♂ I. O. C. Lent; 2 ♂♂, 1 ♀, I. E. E. A.; 1 ♂, col. autor).

A espécie é dedicada à memória do nosso amigo JAAKKO JAMSA, em cuja casa surgiu a idéia do presente trabalho.



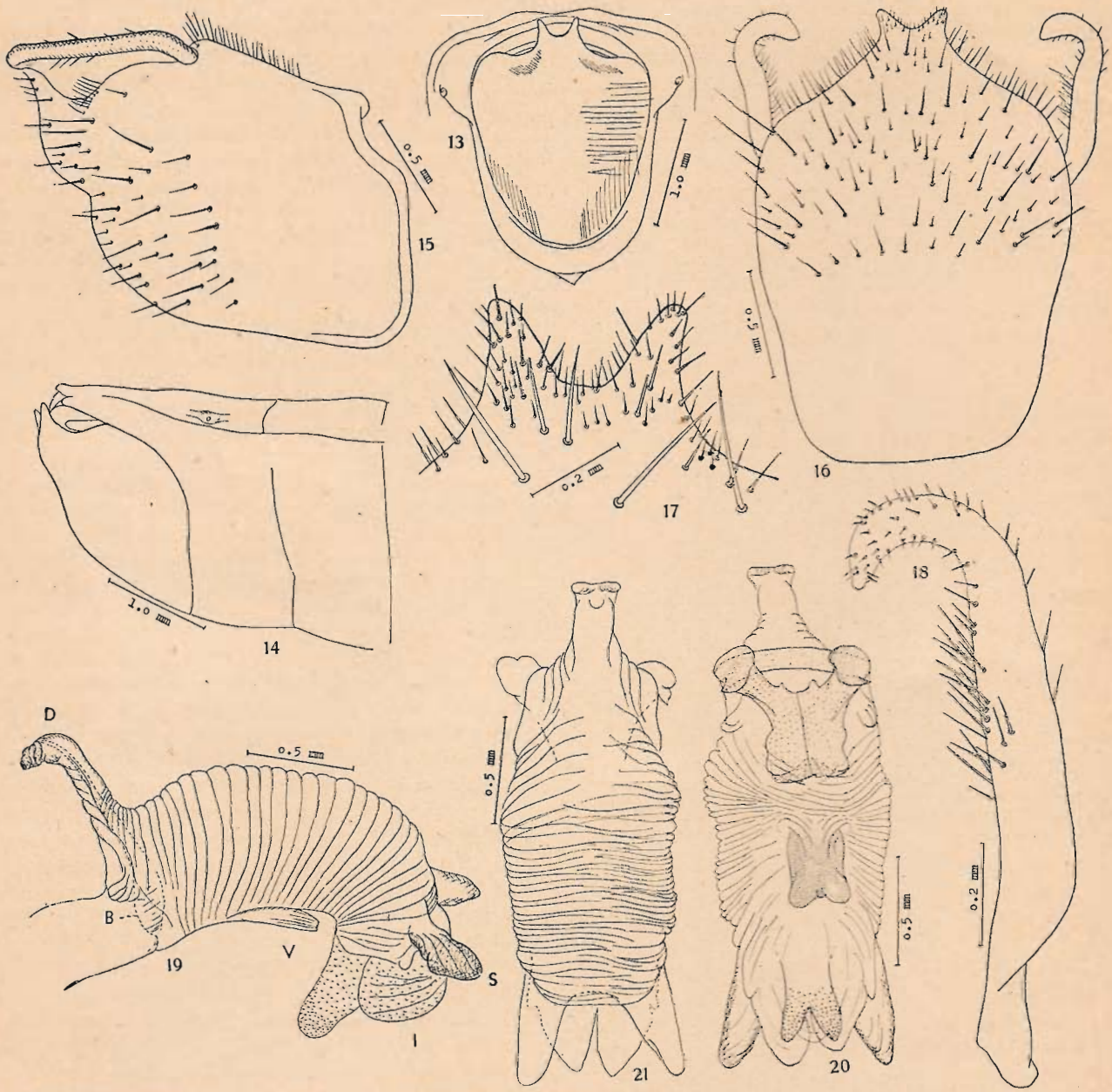
Heniartes jaakkoi n. sp. ♀ — Fig. 8. Região genital, vista de trás e de baixo. — Fig. 9. Região genital, aspecto ventral. — Fig. 10. Bordo posterior do lobo do 8º esternito, com gonapófise anterior. — Fig. 11. Gonapófises medianas e posteriores. — Fig. 12. Conjunto do 9º e 10º tergito. — Wygodzinsky del.

Heniartes australis n. sp.

(figs. 22-23, 187)

Comprimento do corpo 17-18 mm na ♀, 16.0--16.5 mm no ♂; largura máxima do tórax 4.5 mm na ♀, 4.0 mm no ♂; largura máxima do abdômen 4 mm na ♀, 3.5 mm no ♂.

Colorido: Todos os artículos da antena de côr preta uniforme. Face ventral da metade basal do 2º artículo do rostro amarelada. Pronoto vermelho-alaranjado bastante escuro; colarinho e uma mancha central do lobo anterior do pronoto, de extensão variável, pretos. Escutelo preto, o ápice alaranjado. Pleura, esternos e coxas de côr vermelha suja. Clavo semitransparente; cório da côr do pronoto, às vêzes a sua porção anterior mais escura, as duas tonalidades confluindo quase insensìvelmente. Pernas pretas ou castanhas muito escuras, com anéis amarelos ou alaranjados. Fêmur anterior com 1 estreito anel submediano, fêmures medianos e posteriores com 1 anel sub-basal e 1 submediano, sendo o primeiro, em exemplares escuros, invisível no fêmur mediano. Tíbia anterior e mediana com 1 estreito anel submediano; tíbia posterior com 1 largo anel claro, cujo comprimento quase atinge a metade do comprimento total do artículo. Face ventral do abdômen de côr vermelha suja ;hipopígio do macho da mesma côr,



Heniartes jaakkoi n. sp., ♂ — Fig. 13. Ápice do abdômen, aspecto ventral. — Fig. 14. Ápice do abdômen, aspecto lateral. — Fig. 15. Hipopígio, aspecto lateral. — Fig. 16. Hipopígio, aspecto ventral. — Fig. 17. Processo distal do hipopígio. — Fig. 18. Clásper. — Fig. 19. Aedeagus, aspecto lateral. — Fig. 20. Aedeagus, aspecto ventral. — Fig. 21. Aedeagus aspecto dorsal. — Wygodzinsky del.

porém com duas faixas longitudinais submedianas de côr castanha escura (fig. 23). Conexivo manchado de amarelo e castanho escuro.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.5 mm; comprimentos relativos dos artículos = 1 : 0.7 : 1.0 : 1.1-1.3.

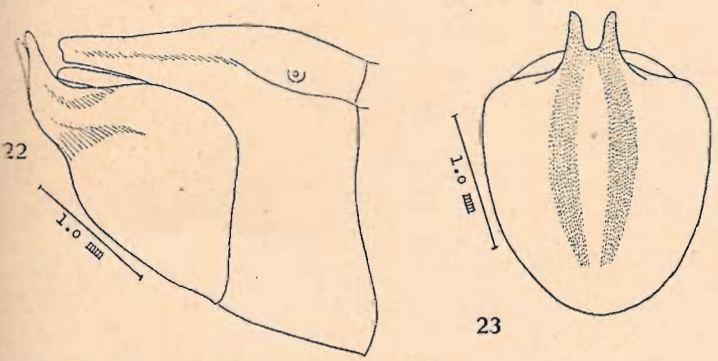
Ângulos ântero-laterais do colarinho pouco salientes. Lobo anterior do pronoto com os lóbulos moderadamente salientes, porém sem tubérculos distintos. Pêlos do pronoto relativamente curtos e fortes, pouco numerosos, os do lobo anterior arrumados em fileiras simples. Escutelo de forma regular, subagudo, posteriormente com distinta crista longitudinal mediana, pouco elevada.

Tíbia anterior ligeiramente curva, fortemente comprimida no sentido lateral, em todo o seu comprimento; tíbia mediana fortemente curva, ligeiramente comprimida; tíbia posterior ligeiramente curva, fortemente comprimida na sua parte basal.

Hemélitros bastante longos, relativamente estreitos, ultrapassando o ápice do abdômen por cêrca de 1 mm.

Genitália da fêmea como em *jaakkoi*.

Genitália do macho: Hipopígio com a saliência apical curta, larga, o seu colorido acima descrito; processos apicais não muito afastados na sua base, bastante compridos, subparalelos, subagudos. Clásperes como em *jaakkoi;* aedeagus como em *jaakkoi*.



Heniartes australis n. sp., ♂ — Fig. 22. Ápice do abdômen, aspecto lateral. — Fig. 23. Hipopígio, aspecto ventral. — Wygodzinsky del

Distribuição: Ipiranga, São Paulo, Brasil, 10-10-1900, Luederwaldt col. (1 ♀, Dep. Zool.); Estação da Serra, São Paulo, Brasil, 15-10-1906, H. Luederwaldt col. (1 ♂, Dep. Zool.); Piraquara, São Paulo, Brasil, 17-1-1944 (1 ♀, I. O. C. Lent); Fazenda Bom Jesus, Monte Alegre, 750 m. Estado de São Paulo, Brasil, 14/27-10-1942, L. Travassos Filho & Almeida col. (1 ♀, Dep. Zool.); Cabeceira do Rio M'boy Guaçu, Campos da Serra, Estado de São Paulo, Brasil, 11/25-11-1940, F. Lane col. (1 ♀, Dep. Zool., 1 ♂ holótipo, 1 ♀ alótipo, I. E. E. A.); Rio Negro, Paraná, Brasil, 1-1929 (1 ♀, Inst. Biol.); Ponta Grossa, Paraná, Brasil, 1938, Camargo col. (1 ♀, I. O. C., Lent); Guaraúna, Paraná, Brasil, 27-1-1938, Camargo col. (1 ♀, I. O. C., Lent).

A espécie está extremamente próxima de *jaakkoi* n. sp., podendo ser confundida com esta no sexo feminino; distingue-se, porém, pelo tamanho geralmente maior, e principalmente pela genitália do macho, isto é, pelo hipopígio, marcado de duas faixas longitudinais escuras, e pelos processos apicais do hipopígio, mais compridos do que naquela espécie, e distintamente subparalelos, sendo divergentes em *jaakkoi*.

Heniartes lopesi n. sp.

(figs. 24-28)

Macho.

Comprimento do corpo 13.5 mm; largura máxima do pronoto 3.5 mm; largura máxima do abdômen 2.5 mm. Forma geral parecida com a de *jaakkoi*, porém ainda mais delicada.

Colorido: Antenas inteiramente pretas, assim como o rostro. Colarinho e região central do lobo anterior do pronoto de colorido castanho escuro, região lateral do lobo anterior e todo o lobo posterior do pronoto de côr amarelo-alaranjada muito clara. Propleura, esternos e coxas de colorido amarelo claro, meso e metapleura de colorido píceo escuro. Escutelo preto, com o ápice amarelado. Cório de colorido vermelho- alaranjado claro uniforme, apenas ligeiramente amarelado na sua extremidade posterior. Fêmures de côr pícea escura, o posterior com um estreito anel claro basal, todos os fêmures com 1 estreito anel claro submediano; tíbia anterior com 1 estreito anel basal de côr pícea escura, o resto do artículo de côr preta, exceção feita de um estreito anel esbranquiçado submediano. Tíbia mediana ? Tíbia posterior de côr amarelada mais ou menos clara nos seus 2/3 basais, o têrço distal preto; não existe anel preto basal. Face ventral do abdômen de colorido vermelho alaranjado claro, ficando ligeiramente mais escura nas regiões laterais dos esternitos. Hipopígio preto, com exceção da margem basal e de três manchas claras submedianas, que são de côr vermelha (fig. 25). Conexivo manchado de amarelo e preto, ocupando as manchas pretas cêrca da metade da área total dos respectivos segmentos conexivais.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo da antena 2.5 mm; comprimentos relativos dos artículos = 1 : 1.0 : 1.4 : 1.2.

Ângulos ântero-laterais do colarinho pouco salientes, arredondados. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem tubérculos apicais. Pêlos do lobo anterior e do posterior bastante finos e compridos, pouco numerosos, os do lobo anterior arrumados em fileiras simples.

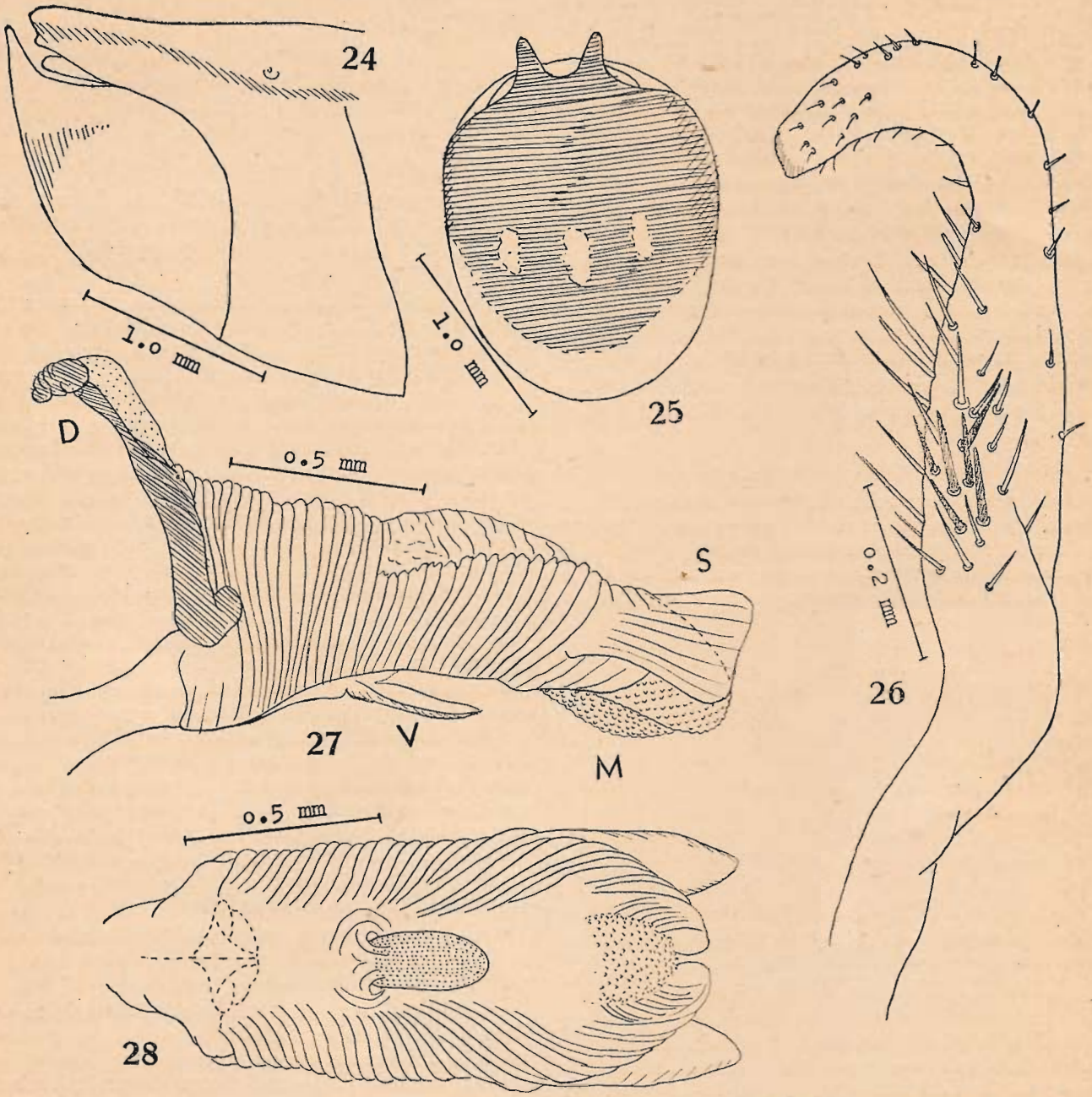
Escutelo relativamente curto, subagudo, a crista longitudinal mediana pouco elevada posteriormente.

Tíbia anterior ligeiramente curva, fortemente comprimida em todo o seu comprimento. Tíbia mediana ? Tíbia posterior quase reta, distintamente comprimida na sua parte basal.

Hemélitros pouco alongados, ultrapassando o ápice do abdômen por cêrca de 0.7 mm.

Genitália (figs. 24-28): Colorido do hipopígio como acima descrito. Processos apicais curtos, subtriangulares, bastante afastados na sua base. Clásper curto, relativamente curvo, com as cerdas da face ventral pouco numerosas, curtas, por parte bem

fortes e mais esclerosadas. Aedeagus alongado, o envólucro não atingindo o ápice do processo dorsal (D); processo lateral basal indistinto; placa ventral (V) destacada do envólucro, pequena, estreita, comprimentos relativos ligeiramente diferentes dos artículos da antena, sendo o 3º artículo relativamente mais comprido, e os caracteres da genitália; isto é, o clásper ligeiramente diferente e a placa ventral do



Heniartes lopesi n. sp., ♂ — Fig. 24. Ápice do abdômen, aspecto lateral. — Fig. 25. Hipopígio, aspecto ventral. — Fig. 26. Clásper. — Fig. 27. Aedeagus, aspecto lateral. — Fig. 28. Aedeagus, aspecto ventral. — Wygodzinsky del.

arredondada apicalmente; processos terminais laterais superiores e inferiores sem particularidades, curtos, membranosos; processo distal inferior mediano (M) simples.

Distribuição: Lassance, Minas Gerais, Brasil, 20/31-1-1939, Martins, Lopes & Mangabeira col. (1 ♂ holótipo, I. O. C., Lent).

A presente espécie, sem dúvida muito próxima de *jaakkoi*, difere desta por alguns caracteres, como indicado na chave; queremos mencionar ainda os aedeagus, mais estreita do que na espécie mencionada.

Dedicamos esta espécie ao nosso amigo Professor Hugo de Souza Lopes, a quem muito devemos.

Heniartes annulatus Spinola, 1837

(figs. 29-35, 190)

Comprimento do corpo 17.0-17.5 mm na ♀, 15.5 mm no ♂; largura máxima do pronoto 4.5 mm

na ♀, 4 mm no ♂; largura máxima do abdômen 4.0 mm na ♀, 3.5 no ♂. Forma geral conforme figura 190.

Colorido: Antenas pretas, 3º artículo com estreito anel basal de colorido amarelo esbranquiçado. Rostro preto, a face ventral da metade basal do 2º artículo de colorido amarelado. Pronoto de colorido vermelho-alaranjado bastante escuro, sendo o colarinho e o lobo anterior ainda mais escuros que o lobo posterior; às vêzes a região mediana do lobo anterior preta. Pleura, esternos, coxas e trocanteres do colorido do pronoto. Escutelo preto, com a região posterior da côr do pronoto. Parte posterior do clavo semi-hialino; parte anterior do clavo e o cório de colorido vermelho-alaranjado bastante escuro, sendo apenas a extremidade posterior do cório de tonalidade mais clara. Fêmures de colorido vermelho escuro, com 3 estreitos anéis de colorido vermelho mais claro, 1 apical, 1 subapical e 1 sub-basal, sendo os anéis, especialmente o último mencionado, nem sempre bem visíveis. Têrço proximal da tíbia anterior dividido num estreito anel basal de colorido vermelho claro, e 1 estreito anel sub-basal de colorido amarelado; os restantes 2/3 da tíbia anterior pretos. Tíbia mediana de colorido vermelho relativamente claro, com um anel sub-basal amarelado, cujo comprimento é ligeiramente maior do que a sua distância da base do artículo; êste anel é interrompido por um anel escuro muito estreito, nem sempre bem visível. Tíbia posterior com 1 estreito anel basal de colorido vermelho claro, uma larga região amarelada, cujo comprimento corresponde a cêrca da metade do comprimento total do artículo, e que perto da sua base é interrompido por um estreito anel escuro, nem sempre bem visível; o têrço restante da tíbia de côr preta. Face ventral do abdômen de colorido castanho-avermelhado sujo relativamente escuro; genitália de côr avermelhada mais clara. Conexivo manchado de castanho claro e escuro, sendo as manchas nem sempre bem visíveis; as manchas escuras ocupam cêrca da metade da área total dos respectivos segmentos conexivais.

Cabeça como em *flavicans*. Comprimento do 1º artículo das antenas 3 mm; comprimentos relativos dos artículos = 1 : 0.8 : 1.1-1.3 : 1.1.

Ângulos ântero-laterais do colarinho pouco salientes, pequenos, subagudos. Lobo anterior do pronoto com os lóbulos ligeiramente elevados, cada um com um tubérculo apical pequeno, mas bem distinto. Pêlos do lobo anterior do pronoto compridos e fortes, não muito numerosos, formando fileiras definidas; pêlos do lobo posterior menos longos, mais numerosos. Escutelo de forma regular, subagudo, com a crista longitudinal mediana distinta posteriormente.

Tíbia anterior ligeiramente curva, fortemente comprimida em todo o seu comprimento. Tíbia mediana fortemente curva, ligeiramente comprimida. Tíbia posterior ligeiramente curva, fortemente comprimida na parte basal.

Hemélitros bastante alongados, ultrapassando o ápice do abdômen por cêrca de 0.5 mm na ♀, e 1 mm no ♂.

Genitália da ♀ como em *jaakkoi;* gonapófises anteriores conforme fig. 35.

Genitália do macho (figs. 31-35). Saliência apical do hipopígio bastante alongada, de comprimento ligeiramente variável. Processos apicais longos, aproximados na sua base, muito ligeiramente divergentes, arredondados apicalmente. Clásper de forma simples, na sua face ventral com numerosas cerdas bastante fortes e curtas, cujo comprimento corresponde aproximadamente ao da metade do diâmetro do clásper nesta região. Aedeagus como em *jaakkoi*, os dois ganchos do processo dorsal do falosoma membranosos, muito grandes e divergentes.

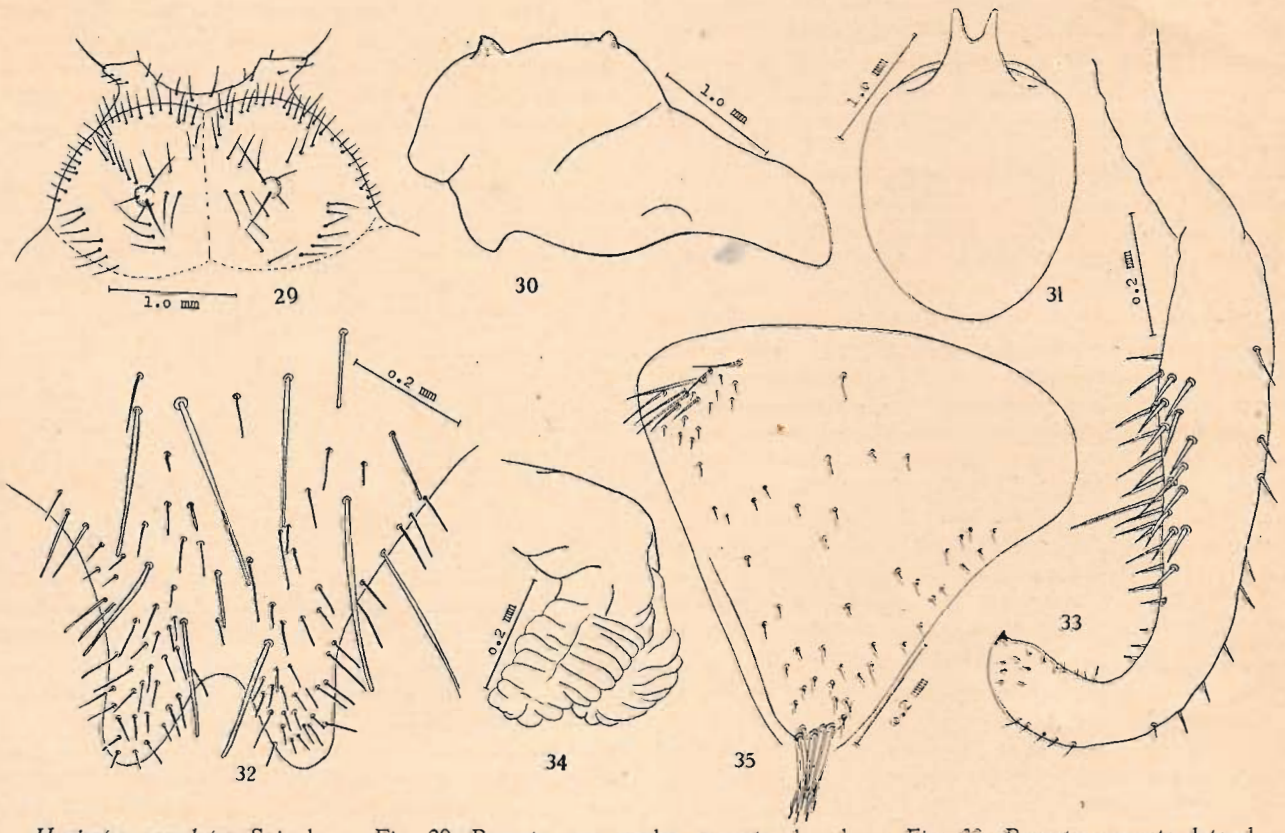
Distribuição: Goiânia, Goiaz, Brasil, 8-1943, Freitas & Nobre col. (1 ♂, 2 ♀ ♀, I.O.C. Lent; 1 ♀, I. E. E. A.; 1 ♀, col. autor); Goiânia, Goiaz, Brasil, 17-5-1938, F. Lane col. (1 ♀, I. O. C. Lent); Rio das Almas, Goiaz, Brasil, 5-1938, F. Lane col. (1 ♀, I. O. C. Lent); Campinas, Goiaz, Brasil, 1-1938, 2-1938, R. Spitz col. (1 ♂ I.E.E.A., 1 ♂ col. autor); Caiaponia, Goiaz, Brasil, 1-1945, J. C. M. Carvalho col. (1 ♀, col. autor); Aragarças, Goiaz, Brasil, 1-1945, J. C. M. Carvalho col. (1 ♀, col. autor); Lagoa Santa, Minas Gerais, Brasil, 5-2-1939, H. S. Lopes col. (1 ♂, I. E. E. A.); Lagoa Santa, Minas Gerais, Brasil; 26-6-1940. M. Aragão col. (1 ♂, E. N. A.); Carmo do Rio Claro, Sul de Minas, Minas Gerais, Brasil, 12-1944, J.C.M. Carvalho col. (1 ♂, col. autor); Ilha Seca, São Paulo, Brasil, 18/26-2-1940, Com. I. O. C. col. (1 ♂, I. O. C. Lent); Monte Alegre, São Paulo, Brasil, 750 m, 14/27-10-1942, L. Travassos Filho & Almeida col. (2 ♂ ♂, 2 ♀ ♀, Dep. Zool.); Fazenda Sta. Maria, Monte Alegre, São Paulo, Brasil, 1100 m, 24/30-11-1942, F. Lane col. (1 ♂, I. O. C. Lent); Itararé, São Paulo, Brasil, 12-1935, E. Sch. col. (1 ♀, 2 ♂ ♂, Inst. Biol.); Vila Olímpia, São Paulo, Brasil, 11-1912, E. Garbe col. (1 ♂, 1 ♀, Dep. Zool.); São Paulo, capital, 24-9-1937, E. Schw. col. (2 ♂ ♂, Inst. Biol.); Nova Teutonia, Santa Catarina, Brasil, 1-11-1944, F. Plaumann col. (1 ♀, col. autor); Curitiba, Paraná, Brasil, 10-1939, 6-1940, 10-1940 (4 ♂ ♂, 2 ♀ ♀, I. O. C. Lent; 1 ♂, col. autor; 1 ♂, U. S. N. M., 1 ♂, British Museum); Rio Claro, Paraná, Brasil (1 ♀, I. O. C. Lent); Rio Negro, Paraná, Brasil, 1-1929 (1 ♂, Inst. Biol.); Iguaçu, Paraná, Brasil, 12-1941, Com. E. N. V. col. (2 ♂ ♂, I. O. C. Lent); São Leopoldo, Rio Grande do Sul, Brasil (1 ♂, I. E. E. A., 1 ♂ col. autor); Rio Grande do Sul, Brasil (1 ♂, 1 ♀, Mus. Holm); Minas Gerais, Brasil (1 ♀, Mus. Holm.); Pto. Iguazú, Terr. Misiones, Argentina, 11-1944, A. F. Prosen col. (1 ♂, col. Prosen); Sta. Maria, Dep. Concepcion, Misiones, Argentina, 10-1943, M. J. Viana leg. (4 ♂ ♂, 2 ♀ ♀, Mus. Argent. Cienc. Nat., com o número 47.716; 1 ♂ I. O. C. Lent; 1 ♂ I. E. E. A.; 1 ♂, col. autor); Misiones, Argentina, 23/24-11-1941, H. L. Parker col. (1 ♂, na col. Carl Drake); Santa Cruz, Bolívia, 9-1917, José Steinbach col. (1 ♀, na col. Carl Drake); Bolívia, sem localidade (2 ♀ ♀, Mus. Argent. Hist. Nat., com o número 11.862); Maracaju, Mato Grosso, Brasil, 3-1937, Shannon & Lane col. (2 ♂ ♂, I. O. C. Lima).

Em *H. annulatus* varia o comprimento relativo do 3º artículo das antenas. Nos exemplares de Iguaçu, Pto. Iguazú e Maracaju, Mato Grosso, o

comprimento relativo dêste artículo é igual à 1.2-1.3; na maioria dos outros exemplares êste valor corresponde a 1.0. Nos dez exemplares examinados do Território de Misiones o valor varia de 0.9 até 1.3. Como os exemplares aberrantes concordam em todos os caracteres, inclusive os da genitália de ambos os sexos, com os insetos típicos, não os consideramos como unidade taxonômica diferente.

A espécie se parece superficialmente com *H. erythromerus* Spinola, descrita em seguida. Os caracteres indicados em nossa chave servem para distinguí-las perfeitamente.

tos, os anteriores com 1 anel amarelo claro submediano e 1 subapical, ambos bastante estreitos; fêmures medianos e posteriores com êstes anéis e mais 1 anel basal, ligeiramente mais longo que os mencionados. Base das tíbias preta, seguida de 1 largo anel de côr alaranjada clara, interrompido no seu meio por 1 estreito anel escuro, nem sempre bem distinto; na tíbia posterior, a largura dêste anel corresponde a cêrca de um têrço do comprimento total do artículo; parte distal da tíbia preta, ocupando a área preta na tíbia anterior menos que a metade do comprimento total da tíbia. Escutelo preto, com o ápice amarelado.



Heniartes annulatus Spinola — Fig. 29. Pronoto com cerdas, aspecto dorsal. — Fig. 30. Pronoto, aspecto lateral. — Fig. 31. Hipopígio, aspecto ventral. — Fig. 32. Processo distal do hipopígio. — Fig. 33. Clásper. — Fig. 34. Ápice do processo dorsal do aedeagus. — Fig. 35. — Gonapófise anterior da ♀. — Wygodzinsky del

Heniartes triannulatus n. sp.

(fig. 188)

Fêmea.

Comprimento do corpo 15.5 mm; largura máxima do pronoto 4.3 mm; largura máxima do abdômen 3.5 mm. Forma geral conforme fig. 188.

Colorido: Artículos da antena uniformemente pretos. Ápice do 1º e base do 2º artículo do rostro, especialmente na face ventral, de colorido amarelado. Colarinho e região central do lobo anterior do pronoto vermelhos; as regiões laterais do lobo anterior, e o lobo posterior do pronoto de colorido vermelho alaranjado claro. Pleura, esternos, coxas, trocanteres de colorido vermelho alaranjado ligeiramente mais escuro do que no pronoto. Escutelo preto, ápice amarelado. Fêmures muito escuros, quase pretos. Cório de colorido vermelho-alaranjado claro, sendo mais escuro na parte basal e mais claro na distal. Face ventral do abdômen de colorido vermelho-alaranjado claro, sendo de côr castanha escura uma parte do 8º esternito, e de côr preta o conjunto do 9º e 10º tergito. Conexivo manchado de amarelo e castanho, nem sempre muito distintamente; as manchas escuras ocupam cêrca de 1/2 da área total do respectivo segmento do conexivo.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3 mm; comprimentos relativos dos artículos = 1 : 0.8 : 1.0 : 1.2.

Ângulos ântero-laterais do colarinho pouco salientes, grossos, aguçados. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem tubérculos apicais distintos. Escutelo de forma regular, com a crista mediana longitudinal saliente posteriormente.

Tíbia anterior pouco curva, fortemente comprimida em todo o seu comprimento. Tíbia mediana fortemente curva, ligeiramente comprimida; tíbia posterior ligeiramente curva, distintamente comprimida em todo o seu comprimento.

Hemélitros pouco alongados, ultrapassando o ápice do abdômen por cêrca de 0.5 mm.

Genitália como em *jaakkoi*, porém os pêlos e as cerdas espiniformes dos lobos do 8º esternito menos numerosos.

Distribuição: São João. Água Preta, Ilhéos, Bahia, Brasil 9/10-1928, E. May col. (1 ♀, holótipo, Mus. Nac.)

H. triannulatus n. sp. pertence ao grupo *jaakkoi;* difere de tôdas as espécies do grupo pelo colorido do fêmur.

Heniartes erythromerus Spinola, 1837

(figs. 36-42, 189)

Heniartes mayri Berg, 1884.

Comprimento do corpo 16-18 mm na ♀, 16.0--16.5 mm no ♂; largura máxima do pronoto 4.5--5.0 mm na ♀, 4 mm no ♂; largura máxima do abdômen 4.5 mm na ♀, 4.0 mm no ♂. Corpo muito largo, o abdômen de bordos laterais subparalelos, truncado posteriormente, conforme fig. 189.

Colorido: Antenas de colorido uniformemente preto. Parte distal do 1º e face ventral do 2º artículo do rostro avermelhados; às vêzes, todo o rostro preto, ou mesmo totalmente avermelhado. Colarinho e pronoto uniformemente de colorido vermelho alaranjado brilhante; pleura, esternos, coxas e trocanteres da mesma côr. Parte anterior do escutelo preta, parte lateral e posterior vermelha. Cório uniformemente do colorido do pronoto. Fêmures de colorido vermelho bastante intenso, com 1 anel basal, 1 submediano e 1 subapical de colorido vermelho muito claro; êstes anéis, porém, raramente bem visíveis, parecendo então os fêmures uniformemente de colorido vermelho bem claro. Base da tíbia mediana do colorido dos fêmures, seguida de um anel bastante largo de colorido amarelado, interrompido no seu meio por um estreito anel escuro; a metade distal do artículo preta ou pícea escura. Tíbia posterior do colorido da mediana, ocupando o anel amarelo ligeiramente menos do que a metade do comprimento total do artículo. Face ventral do abdômen de colorido vermelho claro ou escuro uniforme, inclusive a genitália, em ambos os sexos. Conexivo manchado de amarelo e castanho escuro, ocupando as manchas escuras ligeiramente mais do que a metade da área total do respectivo segmento do conexivo.

Cabeça como em *flavicans*. Comprimento do 1º artículo das antenas 3.0 mm; comprimentos relativos dos artículos = 1 : 0.7 : 0.7-0.75 : 1.0.

Ângulos ântero-laterais do colarinho pouco salientes, subagudos. Lobo anterior do pronoto com os lóbulos pouco elevados, cada um com um distinto tubérculo apical. Pêlos do lobo anterior e posterior bastante longos e fortes, pouco numerosos, os do lobo anterior arrumados em fileiras definidas, os do lobo posterior irregulares. Escutelo de forma regular, subagudo, crista mediana longitudinal bem distinta posteriormente.

Tíbia anterior ligeiramente curva, fortemente comprimida em todo o seu comprimento. Tíbia mediana fortemente curva, ligeiramente comprimida; tíbia posterior quase reta, distintamente comprimida em quase todo o seu comprimento.

Hemélitros largos, pouco alongados, ultrapassando o ápice do abdômen por cêrca de 0.5 mm, em ambos os sexos.

Genitália da fêmea como a de *jaakkoi*, existindo, porém, no ângulo interno basal das gonapófises anteriores um tufo composto de grande número de macroquetas bem longas. Cerdas espiniformes das gonapófises posteriores ligeiramente mais fortes do que em *jaakkoi*.

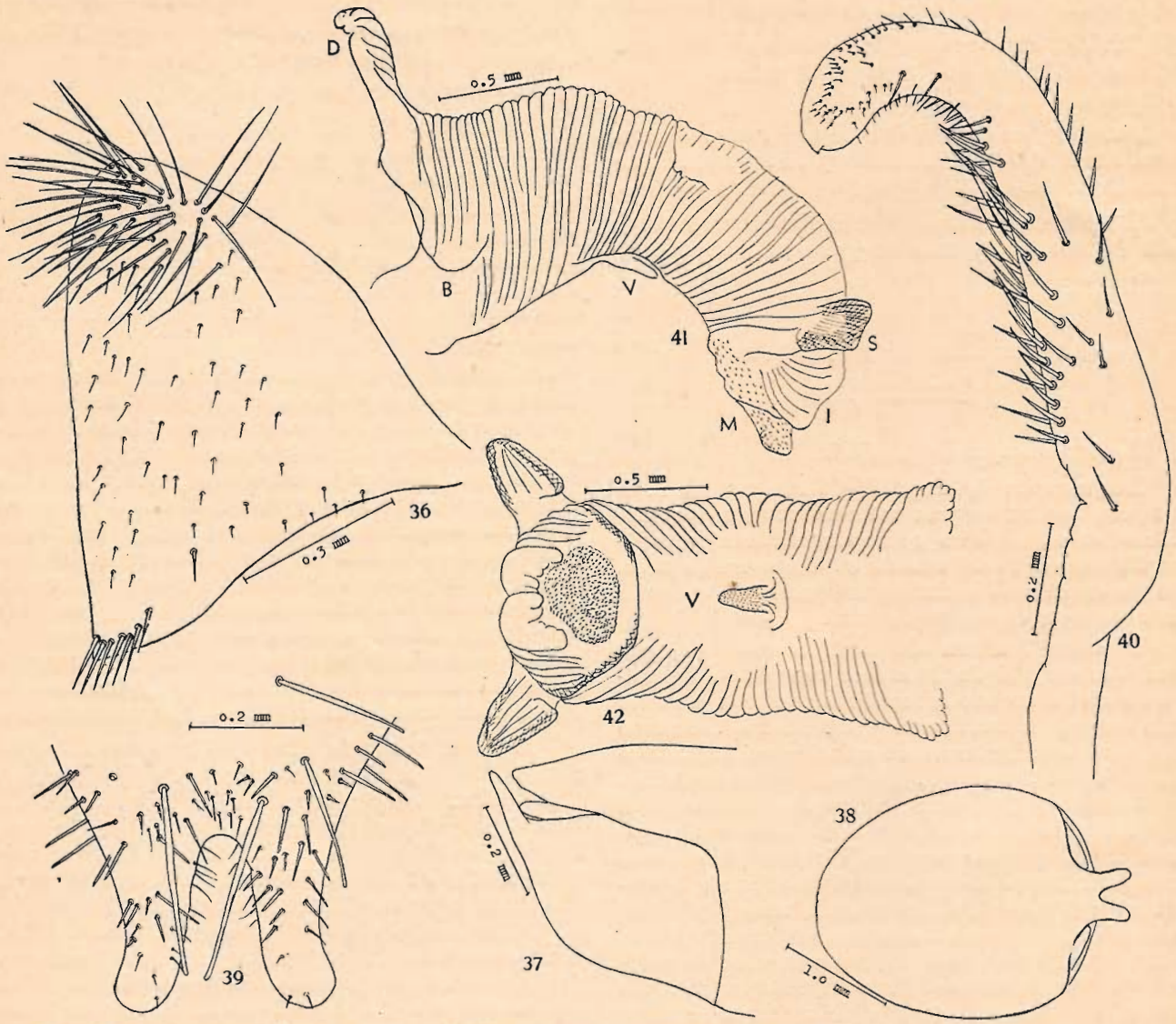
Genitália do ♂ (figs. 37-42): Saliência apical do hipopígio curta, processos apicais muito compridos, aproximados na sua base, ligeiramente divergentes apicalmente, de lados paralelos, arredondados apicalmente. Clásper bastante alongado, a sua face ventral com numerosas cerdas bem fortes e curtas, cujo comprimento quase nunca alcança o do diâmetro do clásper. Aedeagus alongado, conforme figuras 41 e 42; processo dorsal (D) livre apicalmente; processos basais laterais imperceptíveis; placa ventral (V) distinta, mas muito pequena, triangular; processos terminais laterais superiores (S) curtos ligeira mas distintamente esclerosados; processos terminais laterais inferiores (I) curtos, membranosos.

Distribuição: San Cosme, Corrientes, Argentina, 3-1938 (1 ♂, 3 ♀♀, na coleção do Mus. Argent. Cienc. Nat., com o número 47.723; 1 ♀, I. O. C. Lent; 1 ♂, col. autor); Loreto, Misiones, Argentina, Ogloblin col. (1 ♀, col. Ogloblin); Misiones, Argentina (2 ♂♂, na coleção do Mus. Argent. Cienc. Nat., com o número 7.598); Bolívia, sem localidade, (1 ♂, na coleção do Mus. Argent. Cienc. Nat., com o número 11.862); Paraguai, sem localidade (1 ♂, na coleção do Mus. Argent. Cienc. Nat., com o número 47.725); Sapucaí, Paraguai, 1901--1903 (3 ♂♂, 2 ♀♀, Cornell; 1 ♂, I. E. E. A.; 1 ♂, U. S. N. M.; 1 ♀, British Museum; 1 ♂, 1 ♀, col. autor); Puerto Gal. Diaz, Paraguai, 3-1944, Mis. Cient. Brasil col. (3 ♀♀, I. O. C. Lent); Paraguai, sem localidade (1 ♂, col. autor); Pôrto Alegre, Rio Grande do Sul, Brasil, 1-1939 (1 ♀, Dep. Zool.); São Leopoldo, Rio Grande do Sul, Brasil, 1-1927 (1 ♂, col. Padre P. Buck, com o número 1.403, 1 ♂, 1 ♀, Mus. Holm.; 1 ♀, I. E. E. A.; 1 ♀, col. autor); Curitiba, Parolim, Paraná, 11-1935, 12-1939 (2 ♀♀, I. O. C., Lent); Curitiba, Paraná, Brasil, 23-12-1938, Westermann col. (1 ♂, 1 ♀, I. O. C. Lent); Curitiba, Paraná, Brasil, 10-1939, 6-1940, 10-1940 (2 ♂♂, 7 ♀♀, I. O. C. Lent, 1 ♀, I. E. E. A.; 1 ♂, 1 ♀, col. autor); Rio Claro, Paraná, Brasil (1 ♀, I. O. C. Lent); Anápolis, Goiaz, Brasil, 2-7-1936 (1 ♀, I. E. E. A.); Urutaí, Goiaz, Brasil, 27-11-1927, A. M. Parko col. (1 ♂, 1 ♀, Mus. Nac.; 1 ♂, col. autor); São Paulo, Ipiranga, Brasil, 25-5-1907, H. Luederwaldt col.

(1 ♀, Dep. Zool.); Carmo do Rio Claro, Sul de Minas, Minas Gerais, Brasil, 12-1944, J. C. M. Carvalho col. (2 ♀♀, col. autor); Virgínia, Minas Gerais, Brasil, 900 m, 4-3-1921, J. F. Zikán col. (1 ♂, col. Zikán).

Além disto, possuimos material da espécie de São Leopoldo, a localidade típica.

Estudando a descrição original de *Heniartes mayri* Berg, 1884, assim como as fotografias do tipo, mandadas gentilmente pelo Prof. MAX BIRABÉN, e



Heniartes erythromerus Spinola — Fig. 36. Gonapófise anterior da fêmea. — Fig. 37. Ápice do abdômen do macho, aspecto lateral. — Fig. 38. Hipopígio, aspecto ventral. — Fig. 39. Processo apical do hipopígio. — Fig. 40. Clásper. — Fig. 41. Aedeagus, aspecto lateral. — Fig. 42. Aedeagus, aspecto ventral. — Wygodzinsky del

Nos exemplares de Anápolis-Goiaz e Urutaí-Goiaz, a porção anteocular da cabeça, o rostro, os artículos basais das antenas e a parte distal das tíbias medianas e posteriores são de colorido carmesim, em vez de preto. Todos os caracteres morfológicos dêstes exemplares, inclusive os da genitália do ♂, correspondem aos dos outros exemplares examinados.

Não examinamos o tipo de *H. erythromerus* Spinola. Achamos, porém, altamente provável corresponder a espécie em mão à de SPINOLA, visto coincidirem os dados essenciais da descrição original com os do nosso material (os fêmures da nossa espécie, mais do que em qualquer outra, podem ser considerados como «rouges, sans anneaux noirs.»). aqui reproduzidas (figs. 215, 216), não encontramos nenhuma diferença entre *erythromerus* e aquela espécie. Consideramos, então, *Heniartes mayri* Berg, 1884, como sinônimo de *Heniartes erythromerus* Spinola, 1837.

Heniartes birabéni n. sp.

(figs. 43, 191)

Comprimento do corpo 17 mm; largura máxima do pronoto 4.5 mm; largura máxima do abdômen 5 mm. Forma geral relativamente larga, conforme fig. 191.

Colorido: Artículos da antena uniformemente pretos. Rostro inteiramente preto. Pronoto uniforme-

mente de colorido vermelho-alaranjado. Escutelo preto, a sua porção apical da côr do pronoto. Pleura, esternos e coxas da mesma côr. Clavo semitransparente, cório uniformemente da côr do pronoto, assim como uma estreita faixa na base da membrana. Fêmures pretos, com 1 estreito anel vermelho basal. Tíbias pretas, com 1 anel amarelado submediano, quase ou totalmente imperceptível em alguns exemplares; na tíbia posterior, quando visível, com o seu comprimento correspondendo a 1/2-1/3 do comprimento total dêste artículo. Face ventral do abdômen do colorido do pronoto; partes genitais em ambos os sexos da mesma côr. Conexivo manchado de amarelo e castanho escuro ou preto, ocupando as manchas escuras cêrca de 1/2 da área total do respectivo segmento do conexivo.

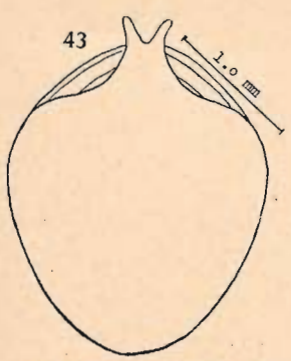
Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.0 mm; comprimentos relativos dos artículos = 1 : 0.7 : 0.8 : 1.0.

Ângulos ântero-laterais do colarinho pouco salientes, porém agudos. Lobo anterior do pronoto com os lóbulos bastante salientes, cada um com um distinto tubérculo pequeno, em cima do qual se inserem duas cerdas curtas. Pêlos do pronoto relativamente fortes, pouco numerosos, em fileiras simples. Escutelo de forma regular, posteriormente com crista mediana longitudinal quase imperceptível.

Tíbia anterior ligeiramente curva, roliça na base, comprimida na metade distal. Tíbia mediana fortemente curva, roliça. Tíbia posterior quase reta, ligeiramente comprimida na sua região sub-basal.

Hemélitros relativamente largos, ultrapassando o ápice do abdômen por cêrca de 1 mm.

Genitália da fêmea como em *erythromerus*. Hipopígio do macho conforme fig. 43; clásperes e aedeagus exatamente como em *erythromerus*.



Heniartes birabéni n. sp. — Figura 43. — Hipopígio, aspecto ventral. — Wygodzinsky del

Distribuição: Orán, Salta, Argentina (1 ♂ holótipo, 1 ♀ alótipo, no Museo Argentino de Ciencias Naturales, com o número 33.497); Jujuy, Argentina (1 ♀, parátipo, no Museo Argentino de Ciencias Naturales, com o número 7.271); Salta, Argentina (1 ♀, parátipo, no Museo de La Plata).

A espécie é bem caracterizada pelos fêmures quase inteiramente pretos, vermelhos apenas na sua base. *Birabéni* se aproxima de *erythromerus* Spinola pela forma muito larga do corpo, pelos tubérculos muito distintos do lobo anterior do pronoto, e pela genitália em ambos os sexos.

Dedicamos a espécie ao Prof. MAX BIRABÉN, a quem devemos muito material interessante para estudo.

Heniartes nordestensis n. sp.

(figs. 44-48, 192)

Comprimento total 17.5 mm na ♀, 16.0 mm no ♂; largura máxima do pronoto 5.0 mm na ♀, 4.5 mm no ♂; largura máxima do abdômen 4.5 mm na ♀, 4.0 mm no ♂. Forma geral conforme fig. 192.

Colorido: Artículos da antena uniformemente de colorido vermelho muito escuro. Parte postocular da cabeça preta, com exceção da região situada imediatamente atrás dos olhos, que é de colorido vermelho muito escuro, como é também a parte anteocular, o 1º e a base do 2º artículo do rostro; a maior parte do 2º e o 3º artículo do rostro de colorido quase preto. Colarinho e pronoto de côr vermelha clara brilhante, com exceção dos tubérculos apicais dos lóbulos anteriores do pronoto, que são bastante escuros. Escutelo preto, a sua parte apical avermelhada. Pleura, esternos e coxas da côr do pronoto. Cório de côr pícea escura, com uma mancha distal de côr vermelha muito clara e brilhante, que atinge o bordo posterior e costal do cório; partes claras e escuras do cório nìtidamente separadas. Trocanteres e fêmures de todos os pares uniformemente de côr vermelha muito escura. Tíbias com 1 estreito anel basal da côr dos fêmures, nem sempre muito distinto, que é seguido de 1 largo anel amarelado ou alaranjado bastante claro, interrompido, perto da sua base, por 1 anel estreito muito escuro; o largo anel claro ultrapassa ligeiramente o meio da tíbia, onde é seguido, afinal, da parte distal da tíbia, que é de colorido vermelho muito escuro, quase preto na tíbia anterior. Face ventral do abdômen de colorido vermelho, os esternitos mais escuros na sua parte lateral; conexivo manchado de amarelo e preto, ocupando as manchas pretas cêrca de 2/3 da área total do respectivo segmento do conexivo. Hipopígio do macho vermelho, com 1+1 faixas escuras longitudinais submedianas, que se reúnem na base do processo distal. Região genital da fêmea de côr vermelha clara.

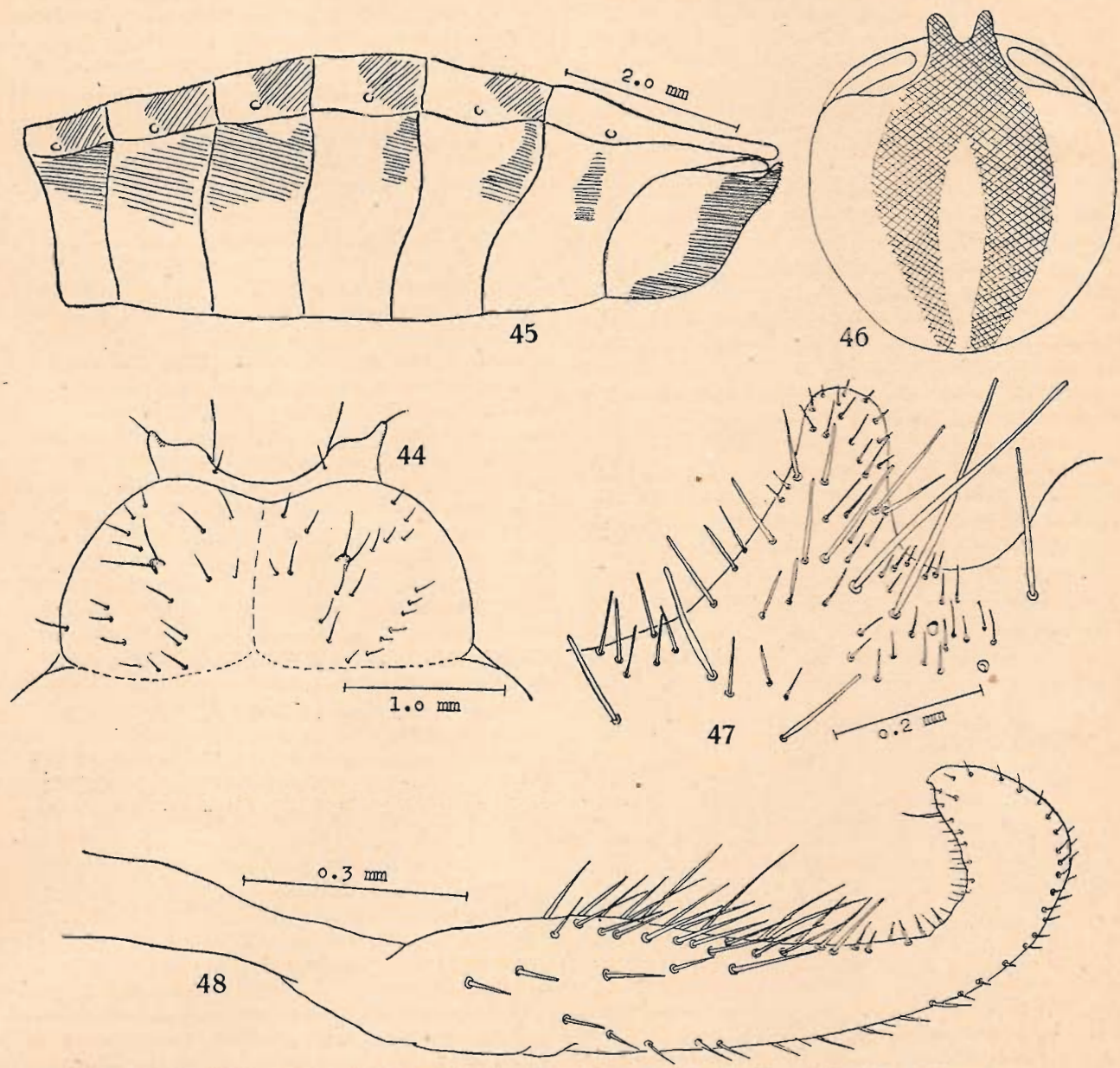
Cabeça como em *flavicans*. Comprimento do 1º artículo da antena 3.7-3.8 mm; comprimentos relativos dos artículos = 1 : 0.7 : 0.7 : 0.9-1.0. Ângulos ântero-laterais do colarinho bem salientes, em forma de processos alongados, dirigidos para a frente. Lobo anterior do pronoto com os lóbulos moderadamente salientes, cada lóbulo com um distinto tubérculo apical. Pêlos do pronoto bastante longos e fortes, muito pouco numerosos, arrumados em fileiras distintas, no lobo anterior; pêlos do lobo posterior menos longos, também muito pouco numerosos. Escutelo de forma regular, subagudo, com a crista mediana longitudinal bem distinta posteriormente.

Tíbia anterior ligeiramente curva, fortemente comprimida em todo o seu comprimento. Tíbia mediana fortemente curva, ligeiramente comprimida. Tíbia posterior reta, bastante comprimida na sua parte basal.

Hemélitros bastante largos, ultrapassando o ápice do abdômen por cêrca de 0.5 mm na ♀, e cêrca de 1 mm no ♂.

Genitália da ♀ como em *erythromerus*; gonapófises posteriores com as cerdas espiniformes muito curtas e fortes.

Genitália do ♂: Hipopígio com a saliência apical relativamente curta; processos apicais subtriangulares, aproximados na sua base, divergentes apicalmente. Forma do clásper conforme fig. 48; pêlos da face ventral em número regular, geralmente mais



Heniartes nordestensis n. sp. — Fig. 44. Pronoto com cerdas, aspecto dorsal. — Fig. 45. Abdômen do macho, aspecto lateral, com esquema da distribuição do colorido. — Fig. 46. Hipopígio, aspecto ventral. — Fig. 47. Processo distal do hipopígio. — Fig. 48. Clásper. — Wygodzinsky del

curtos que o diâmetro do clásper. Aedeagus como em *erythromerus*, porém sem placa ventral distinta.

Distribuição: Nordeste do Brasil, 1933, R. v. Ihering col. (1 ♂ holótipo, 1 ♀ alótipo, 1 ♂ parátipo, I. O. C., Lent; 1 ♂ parátipo, col. autor; 1 ♀ parátipo, I. E. E. A.; 1 ♂ parátipo, U. S. N. M.; 1 ♂, 2 ♀♀, I. O. C., Lima); S. Gonçalo, Sousa, Paraíba, Brasil, 12/19-11-1938, A. Silva col. (3 ♀♀, na coleção da Divisão de Defesa Sanitária Vegetal, São Bento; 1 ♂, I. E. E. A.; 1 ♂, col. autor); Serra da Viração, Paraíba, Brasil, 13-11-1938, A. Silva col. (1 ♂, na coleção da Divisão de Defesa Sanitária Vegetal, São Bento); Gravatá, Pernambuco, Brasil, 18-4-1915, J. F. Zikán col. (1 ♀, na coleção Zikán); Brejo S. José, Pernambuco, Brasil, Schubart col., no. Br. 971 (1 ♂, Mus. Nac.); R. Ouricuri, Pernambuco, Brasil, M. Schubart col., no. Br. 1010 (1 ♂, Mus. Nac.); Vila Nova, Bahia, Brasil, 1908, E. Garbe col. (1 ♂, 1 ♀, Dep. Zool.); Colônia Hansa, Santa Catarina, 2-1940, Anton Maller col. (1 ♂, Inst. Biol.). Esta última localidade, que de modo nenhum corresponde à distribuição geral da espécie, nos parece altamente duvidosa.

Heniartes thoracicus n. sp.

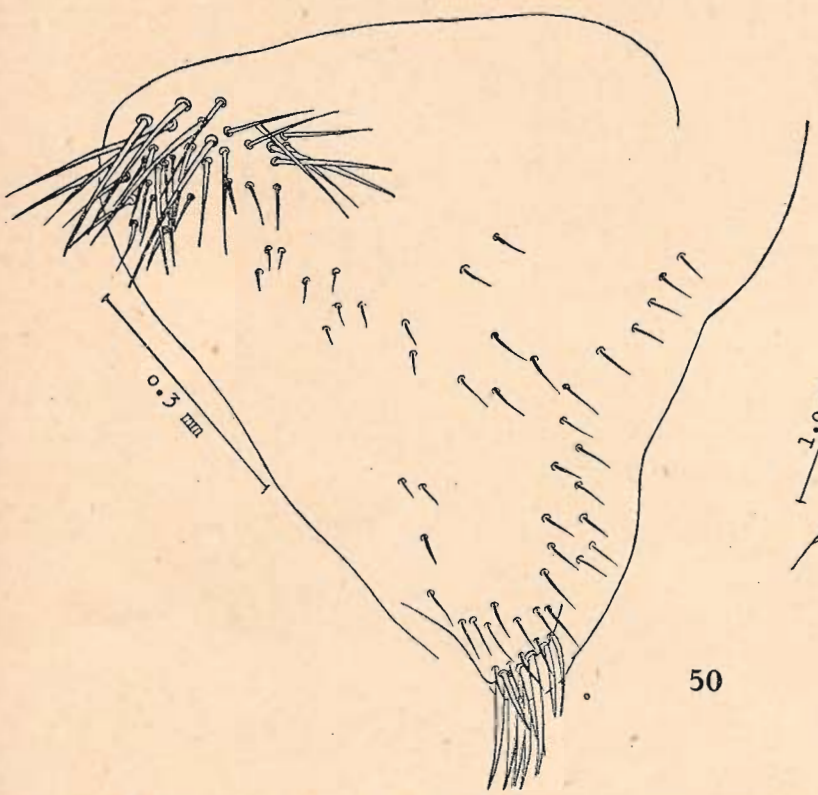
(figs. 49-50, 193)

Fêmea.

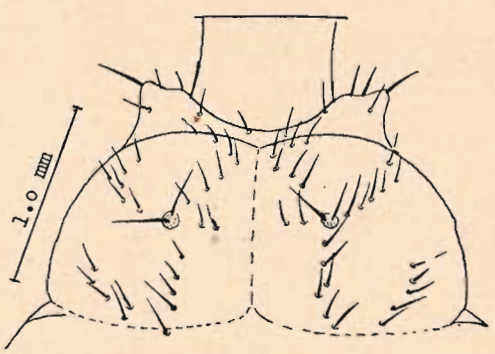
Comprimento total 18.5-19.5 mm; largura máxima do pronoto 4.5-5.0 mm; largura máxima do abdômen 4 mm. Forma geral conforme fig. 193; espécie muito grande, com pernas compridas, e os lados do abdômen subparalelos.

Colorido: Todos os artículos da antena de colorido preto uniforme. Face ventral da metade basal do 2º artículo do rostro de tonalidade avermelhada. Colarinho preto; lobo anterior do pronoto de colorido vermelho brilhante, lobo posterior de côr pícea muito escura ou preta. Propleura, parte anterior e inferior da mesopleura, parte inferior da metapleura, prosterno e mesosterno da côr do lobo anterior do pronoto; parte posterior da mesopleura, parte superior da metapleura e o metasterno de côr pícea escura ou preta; coxas anteriores de colorido vermelho brilhante, as medianas e posteriores de côr vermelha carmesim escura. Clavo píceo escuro; cório de colorido castanho-amarelado claro, a sua porção anterior, porém, de côr pícea escura, colorido que se prolonga numa faixa longitudinal submediana, que não atinge a margem posterior do cório. Pernas de côr preta, com partes mais claras de côr alaranjada ou avermelhada. Fêmures uniformemente pretos. Tíbias anteriores com um anel amarelo-esbranquiçado em posição submediana (indistinto na fotografia apresentada), sendo a metade basal do artículo de côr alaranjada mais escura, e a metade distal preta; tíbia mediana aparentemente de côr alaranjada clara uniforme, exceção feita de 1 estreito anel basal e 1 apical de colorido escuro; tíbia posterior com 1 anel basal de colorido castanho escuro, 1 largo anel submediano de côr amarela clara, e a região apical quase preta. Face ventral do abdômen de côr vermelha carmesim, partes laterais dos esternitos e região genital de côr pícea escura. Conexivo amarelado ou avermelhado, os segmentos posteriormente com uma mancha preta, cujo comprimento não é maior do que 1/3 ou 1/4 do comprimento total do respectivo segmento.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 4 mm; comprimentos relativos dos artículos = 1 : 0.75 : 0.65 : 1.0.



50



49

Heniartes thoracicus n. sp. — Fig. 49. Pronoto com cerdas, aspecto dorsal. — Fig. 50. Gonapófise anterior da fêmea. — Wygodzinsky del.

Ângulos ântero-laterais do colarinho curtos, subagudos. Lobo anterior do pronoto com os lóbulos não muito elevados, cada um com um pequeno tubérculo apical. Pêlos do pronoto fortes, de comprimento regular, pouco numerosos, arrumados, no lobo anterior, em fileiras simples. Escutelo bastante longo, agudo apicalmente, crista mediana longitudinal bastante elevada posteriormente.

Tíbia anterior quase reta, fortemente comprimida; tíbia mediana ligeiramente curva, quase reta, pràticamente roliça; tíbia posterior quase reta, ligeiramente comprimida na região basal.

Hemélitros atingindo o ápice do abdômen, mas não ultrapassando distintamente o mesmo.

Genitália como em *erythromerus*, sendo os respectivos escleritos ainda caracterizados pela sua pigmentação muito forte.

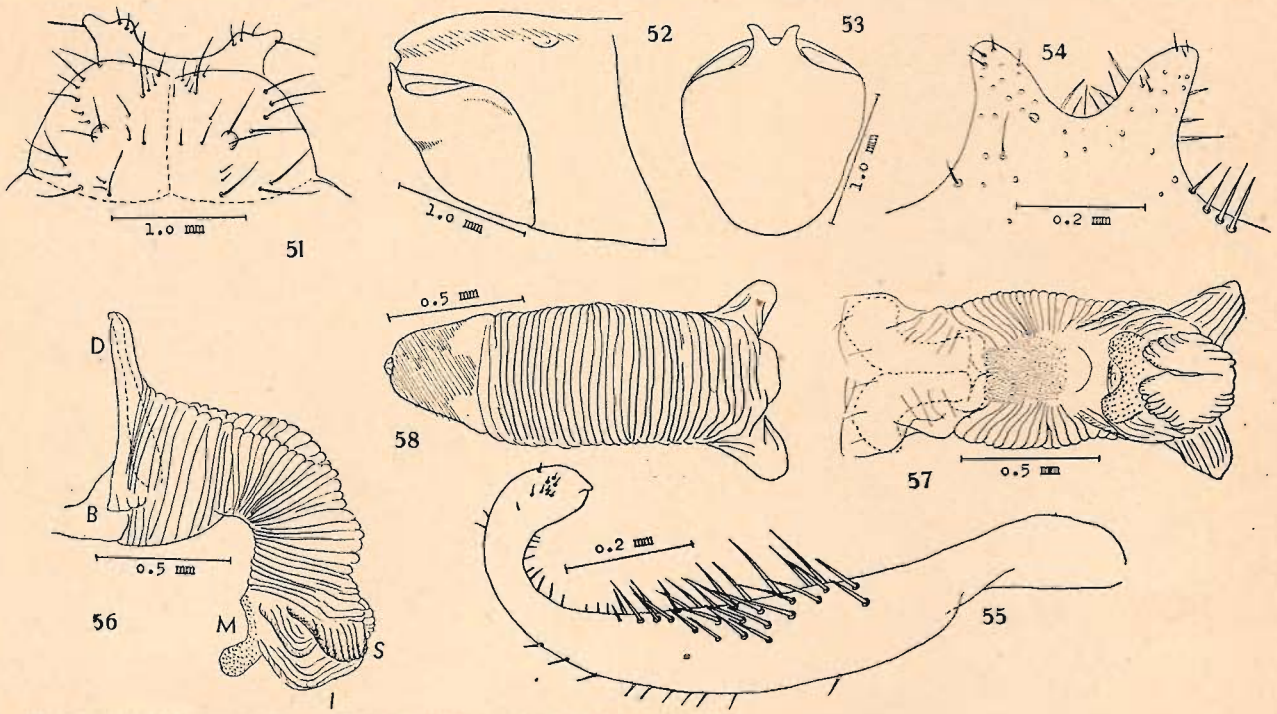
Distribuição: Cordisburgo, Minas Gerais, Brasil, 7/8-11-1919, Cornell University Expedition col. (1 ♀, holótipo, Cornell); Diamantina, Minas Gerais, Brasil, 14/18-11-1919, Cornell University Expedition col. (1 ♀ parátipo, col. autor).

A presente espécie se distingue pelo seu tamanho considerável, sua coloração muito característica, as tíbias pouco curvas, e pelo artículo III das antenas muito curto.

Heniartes travassosi n. sp.

(figs. 51-58, 194)

Comprimento total da ♀ 15.0 do ♂ 14.0 mm; largura máxima do pronoto da ♀ 4.0, do ♂ 3.5 mm; largura máxima do abdômen 3.5 mm. Forma geral do corpo conforme fig. 194; espécie pequena, mas relativamente robusta.



Heniartes travassosi n. sp. — Fig. 51. Pronoto com cerdas, aspecto dorsal. — Fig. 52. Ápice do abdômen, aspecto lateral. — Fig. 53. Hipopígio, aspecto ventral. — Fig. 54. Processo apical do hipopígio. — Fig. 55. Clásper. — Fig. 56. Aedeagus, aspecto lateral. — Fig. 57. Aedeagus, aspecto ventral. — Fig. 58. Aedeagus, aspecto dorsal. — Wygodzinsky del.

Colorido: Todos os artículos da antena uniformemente de colorido vermelho muito escuro. Parte postocular da cabeça preta, parte anteocular e rostro vermelhos muito escuros. Colarinho de côr vermelha muito escura; lobo anterior do pronoto de colorido vermelho brilhante, lobo posterior de côr vermelha distintamente mais escura. Escutelo preto, com o ápice avermelhado. Pleura, prosterno, parte anterior do mesosterno e coxas do colorido do lobo anterior do pronoto; parte posterior do mesosterno e todo o metasterno de colorido píceo escuro. Clavo semihialino; cório da côr do lobo anterior do pronoto, com a porção anterior, mormente no bordo costal, mais escura, não sendo, porém, delimitadas nìtidamente as regiões claras e escuras. Fêmures de todos os pares de colorido vermelho escuro uniforme, brilhantes. Tíbia anterior com 1 anel submediano de colorido amarelo claro; porção proximal dêste artículo de côr castanha bastante escura, porção distal quase preta; tíbia mediana de côr castanha bastante uniforme, sendo vermelho muito escuro na base e quase preto na parte distal, tendo ainda 1 anel claro amarelado submediano, cujo comprimento corresponde ao da tíbia anterior. Tíbia posterior de colorido vermelho escuro na base, ficando na região submediana amarelada, e tornando-se outra vez mais escura para a parte distal, sendo quase preta no ápice. Face ventral do abdômen de côr vermelha brilhante, sendo as partes laterais dos esternitos mais escuras; segmentos genitais da fêmea e hipopígio do macho de colorido vermelho muito escuro. Conexivo manchado de claro e escuro, ocupando as manchas escuras ligeiramente menos do que a metade da área de cada segmento do conexivo.

Cabeça como em *flavicans*. Comprimento do 1º artículo das antenas 3.3 mm; comprimentos relativos dos artículos = 1 : 0.6 : 0.5 : 0.8.

Ângulos ântero-laterais do colarinho muito salientes, alongados, subagudos. Lobo anterior do pronoto com os lóbulos moderadamente salientes, cada lóbulo com um tubérculo apical bem distinto. Pêlos do pronoto bastante compridos, pouco numerosos no lobo anterior, e ali arrumados em fileiras definidas e simples; mais numerosos no lobo posterior. Escutelo de tamanho regular, agudo apicalmente, crista longitudinal mediana distinta posteriormente.

Genitália da ♀ como em *thoracicus*.

Genitália do ♂: Processo apical do hipopígio curto; saliências distais curtas, triangulares, subagudas, aproximadas na sua base, e fortemente divergentes distalmente. Clásper conforme fig. 55; pêlos da sua face ventral em número moderado, o seu comprimento ligeiramente maior do que o do diâmetro do clásper nesta região. Aedeagus muito pequeno, de forma alongada, conforme figs. 56-58. Processo dorsal (D) livre apicalmente; processos laterais basais (B) pouco desenvolvidos; placa ventral inexistente, substituída por uma região de mais forte esclerosação; processos laterais terminais superiores (S) e inferiores (I) sem particularidades, curtos, membranosos.

Distribuição: Diamantina, Minas Gerais, Brasil, 14/18-11-1919, Cornell University Expedition col. (1 ♂ holótipo, 1 ♀ alótipo, Cornell; 1 ♂ parátipo, col. autor); Serra do Cipó, Minas Gerais, Brasil, 11-1938 (1 ♀, I. O. C., Lima).

A espécie se aproxima bastante de *thoracicus* n. sp., acima descrita, e difere da mesma pelos caracteres indicados na chave. O nome é dado em homenagem ao Prof. LAURO TRAVASSOS, cujo laboratório temos a honra e o privilégio de freqüentar, e a quem tanto devem todos os zoólogos que trabalham no Brasil.

Heniartes maracaibo n. sp.

(figs. 59-61, 195)

Fêmea.

Comprimento total 15-16 mm; largura máxima do pronoto 4.0-4.5 mm; largura máxima do abdômen 4.0 mm. Forma geral conforme fig. 195.

Colorido: Todos os artículos das antenas uniformemente pretas. Face dorsal do 1º e o têrço ou a metade basal do 2º artículo do rostro de colorido amarelado. Pronoto de côr vermelho-alaranjada brilhante, com o colarinho mais escuro, os seus ângulos ântero-laterais pretos, e os 2/3 posteriores do lobo posterior do pronoto pretos, inclusive os ângulos umerais. Escutelo uniformemente preto. Propleura, parte anterior da mesopleura, pro, meso e metasterno, assim como as coxas, de colorido avermelhado; parte posterior da mesopleura e tôda a metapleura pretas. Clavo preto; cório preto, exceção feita de uma mancha amarelada ou alaranjada subtriangular posterior, nìtidamente separada da parte anterior preta, que atinge o bordo externo do cório, porém não o interno. Pernas pretas, com anéis alaranjados ou amarelados. Fêmures com 1 anel claro basal e 1 submediano; o comprimento dêstes anéis corresponde mais ou menos ao comprimento das partes pretas restantes. Tíbias com anel submediano claro bastante largo, o do 2º par do comprimento do do 1º; o comprimento do anel claro da tíbia posterior correspondendo a 1/4 do comprimento total dêste artículo. Face ventral do abdômen de côr vermelho-alaranjada brilhante, sendo pretas as partes laterais do 2º-4º e do 7º segmento, ou, às vêzes, de todos os segmentos, sendo neste caso as manchas dos segmentos mencionados mais extensas do que as dos outros. Genitália de côr clara. Conexivo manchado de amarelo e preto; nos segmentos anteriores, as manchas são pouco distintas.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.5 mm; comprimento relativo dos artículos = 1 : 0.7 : 0.8 : ?.

Ângulos ântero-laterais do colarinho pouco salientes, subagudos. Lobo anterior do pronoto com os lóbulos muito pouco elevados, porém com tubérculo apical pequeno, bem distinto. Pêlos do pronoto muito pouco numerosos. Escutelo de forma regular, subagudo, a crista longitudinal mediana bem distinta posteriormente.

Tíbia anterior ligeiramente curva, distintamente comprimida em todo o seu comprimento; tíbia mediana muito curva, ligeiramente comprimida; tíbia posterior quase reta, distintamente comprimida na sua parte basal.

Hemélitros curtos, ultrapassando por 0.5-0.8 mm o ápice do abdômen.

Genitália: Lobos do 8º esternito conforme figura 60; cerdas espiniformes marginais pouco numerosas, fortes e curtas; pêlos do disco regulares, macroquetas não distintas. Gonapófises anteriores (fig. 60) com um pequeno tufo apical, formado de algumas cerdas espiniformes e alguns pêlos; pêlos do disco regulares; ângulo basal interno sem grupo de cerdas. Conjunto das gonapófises posteriores arredondado, com 2+2 grupos de cerdas espiniformes pouco numerosas. Conjunto do 9º e 10º tergito como em *jaakkoi*.

Distribuição: Maracaibo, Venezuela, Dr. B. Tejera col. (1 ♀ holótipo, 1 ♀ parátipo, U. S. N. M.; 1 ♀ parátipo, col. autor).

Heniartes tumatumari n. sp.

(figs. 62-69, 196-197)

Comprimento total 18.5 mm na ♀, 16.5-17.5 mm no ♂; largura máxima do pronoto 4.5 mm na ♀, 4 mm no ♂; largura máxima do abdômen 4.5 mm na ♀, 3.5 mm no ♂. Corpo bastante delgado e comprido, conforme fig. 196.

Colorido: Antenas pretas, base do 3º artículo com 1 anel esbranquiçado, que ocupa cêrca de 1/4-1/3 do comprimento total do artículo. Rostro preto ou píceo escuro, a face ventral da parte basal do 2º artículo mais ou menos distintamente amarelada. Colarinho e lobo anterior e posterior do pronoto uniformemente de colorido vermelho-alaranjado claro. Pleura, esternos e coxas da mesma côr; às vêzes a metapleura enfuscada. Escutelo de côr vermelha escura na parte anterior, bastante clara na posterior. Cório de côr vermelho-alaranjada clara brilhante, pràticamente uniforme, sendo apenas a extremidade posterior distintamente amarelada. Fêmures de côr castanho-avermelhada clara, com 3 anéis amarelados relativamente estreitos: 1 sub-basal, 1 submediano e 1 subapical, sendo o primeiro dificilmente visível. Base das tíbias de côr castanha clara, seguida de 1 anel amarelado relativamente comprido, interrompido no seu meio por 1 anel escuro; parte restante das tíbias de côr pícea escura ou preta, ocupando esta re-

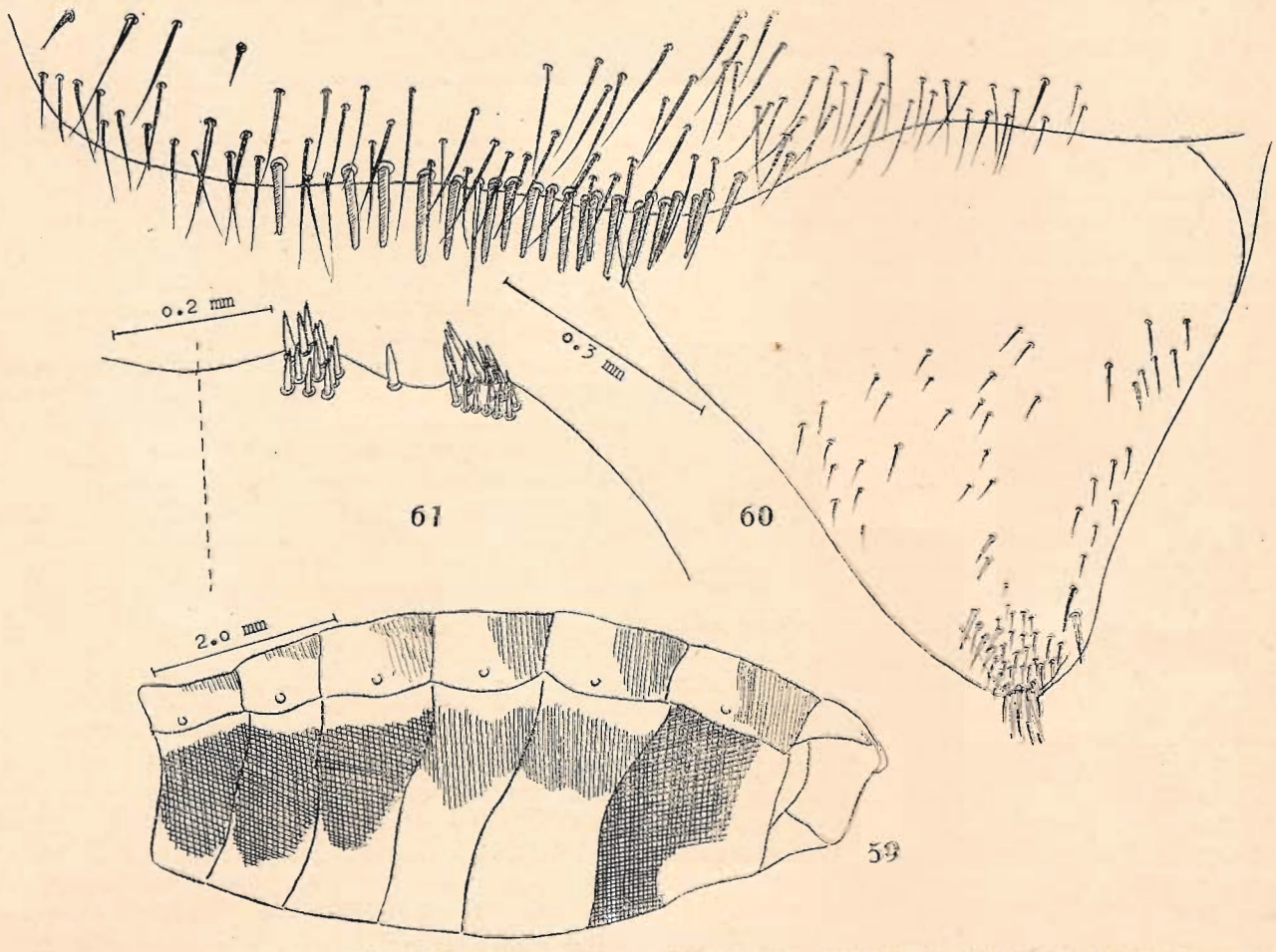
gião escura 2/3 da tíbia anterior, 1/2 da mediana e 1/3 da posterior. Face ventral do abdômen (em exemplares bem conservados) da côr do pronoto; hipopígio do macho de côr amarelada. Conexivo manchado de amarelo-esbranquiçado e castanho escuro, ocupando as manchas escuras cêrca da metade da área total dos respectivos segmentos conexivais.

Cabeça como em *flavicans*. Comprimento do 1º artículo das antenas 4.0 mm; comprimentos relativos dos artículos = 1 : 0.7 : 1.0 : 1.1.

Ângulos ântero-laterais do colarinho bastante salientes, subagudos, com cerdas isoladas. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem tubérculos apicais. Lobo anterior com dois tipos de pêlos: cerdas muito fortes e bastante comterior quase reta, ligeiramente comprimida na parte basal.

Genitália da ♀ como em *jaakkoi*, porém com os pêlos e as cerdas espiniformes dos lobos do 8º esternito ligeiramente menos numerosos. Cerdas espiniformes das gonapófises posteriores (fig. 69) muito mais numerosas.

Genitália do ♂ : Forma geral do hipopígio conforme fig. 63: saliência apical curta, larga; processos apicais curtos, triangulares, aproximados na sua base, fortemente divergentes apicalmente, distalmente com um pequeno gancho; cerdas do hipopígio de dois processos distais muito curtas. Clásper conforme fig. 65: cerdas da face ventral extremamente curtas, muito fortes; parte apical de feitio caracterís-



Heniartes maracaibo n. sp. — Fig. 59. Aspecto lateral do abdômen, com esquema da distribuição do colorido. — Fig. 60. Bordo posterior do lobo do 8º esternito, com gonapófise anterior. — Fig. 61. Gonapófise posterior. — Wygodzinsky del.

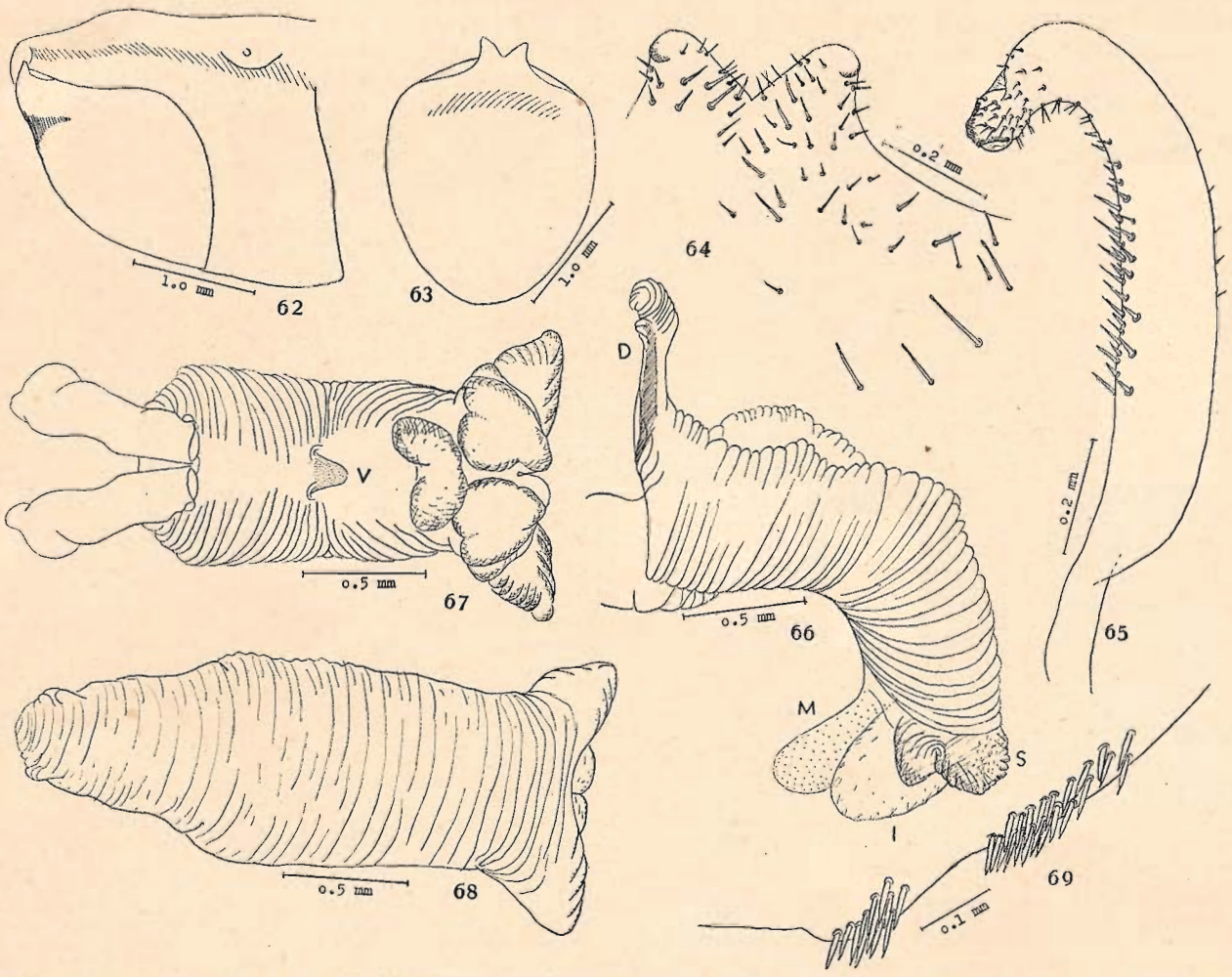
pridas, porém pouco numerosas, inseridas em determinados lugares, e pêlos fortes e muito curtos, formando fileiras e faixas regulares, conforme fig. 197; pêlos do lobo posterior do pronoto de tamanho médio, sem arrumação definitiva. Escutelo de forma regular, bastante alongado, a crista mediana longitudinal bastante elevada posteriormente. Tíbia anterior distintamente curva, mormente na parte apical; quase roliça na sua parte basal, distintamente comprimida apicalmente. Tíbia mediana fortemente curva, ligeiramente comprimida na sua parte apical. Tíbia postico. Aedeagus não muito grande, ligeiramente curvo no aspecto lateral (fig. 66). Envólucro não atingindo o ápice do processo dorsal (D); êste com duas ligeiras saliências apicais; processos basais laterais ausentes; placa ventral (V) pequena, mas distinta, de forma subtriangular; processo lateral distal superior (S) esclerosado, bilobado; processo lateral distal inferior (I) hialino, simples.

Distribuição: Tumatumari, Potaro River, Guiana Britânica, 29-6-1927 (1 ♂ holótipo, 1 ♀ alótipo, Cornell; 1 ♂ parátipo, I. E. E. A.; 1 ♂ parátipo,

col. autor); Mackenzie, Demerara River, Guiana Britânica, 22-6-1927 (1 ♀, Cornell); Kartabo, Bartica District, Guiana Britânica, 4-1-1926, 2-3-1934, W. Beebe col. (1 ♂, 1 ♀, U. S. M. N.); Near Demerara River, Guiana Britânica, 3-1941, W. H. W. Komp col. (1 ♂, U. S. N. M.); West Bank, Demerara River, Guiana Britânica, W. Beebe col., 9-11-1923 (2 ♂♂, col. autor).

A presente espécie é bastante curiosa do ponto de vista taxonômico. Pelo seu aspecto externo, isto é, pela forma muito esbelta e alongada, *tumatumari* se parece com as espécies do grupo *flavicans*, desbastante estreita, como das outras espécies do grupo *flavicans*.

Colorido: Antenas pretas, a base do 3º artículo com um anel claro basal muito curto, ocupando 1/10 do comprimento total do artículo. Cabeça preta; rostro de côr castanha clara, sendo a metade basal do 2º artículo de colorido amarelo claro. Colarinho, todo o pronoto, pleura, esternos e coxas de côr vermelha alaranjada clara. Escutelo da mesma côr. Cório de colorido vermelho-alaranjado claro, amarelado apicalmente. Fêmures de côr castanho-avermelhada clara, com 3 anéis amarelados relativamente estrei-



Heniartes tumatumari n. sp. — Fig. 62. Ápice do abdômen, aspecto lateral. — Fig. 63. Hipopígio, aspecto ventral. — Fig 64. Processo distal do hipopígio. — Fig. 65. Clásper. — Fig. 66. Aedeagus, aspecto lateral. — Figura 67. Aedeagus, aspecto ventral. — Fig. 68. Aedeagus, aspecto dorsal. — Fig. 69. Gonapófise posterior da fêmea. — Wygodzinsky del.

critas a seguir, e com as quais corresponde quanto à sua distribuição geográfica. Examinando, porém, a genitália de ambos os sexos de *tumatumari*, chegamos à conclusão que a espécie, mesmo sendo de posição relativamente isolada, tem certas afinidades com o grupo *jaakkoi*.

Heniartes mendesi n. sp.

(figs. 70-73)

Macho.

Comprimento do corpo 16 mm; largura máxima do pronoto 4.3, do abdômen 4.0 mm. Forma geral tos; 1 sub-basal, 1 submediano e 1 subapical, sendo o primeiro nem sempre bem distinto. Base das tíbias de côr castanha clara, seguida de 1 anel amarelado relativamente comprido, interrompido no seu meio por 1 anel escuro; parte restante das tíbias de côr pícea escura ou preta, ocupando esta região escura 2/3 da tíbia anterior, 1/2 da mediana e 1/3 da posterior. Face ventral do abdômen da côr do pronoto; hipopígio amarelado. Conexivo manchado de amarelo claro e castanho escuro, ocupando as manchas escuras cêrca da metade da área total dos respectivos segmentos conexivais.

Cabeça como em *flavicans*. Comprimento do 1º artículo das antenas 4.5 mm; comprimentos relativos dos artículos = 1 : 0.7 : 1.1 : 1.2. Ângulos ântero-laterais do colarinho distintamente salientes, subtuberculados, com algumas cerdas isoladas. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem tubérculos apicais; os pêlos bastante longos, de um tipo só, não muito numerosos, conforme fig. 70; pêlos do lobo posterior curtos e em número regular. Escutelo de forma regular, a crista mediana longitudinal ligeiramente elevada posteriormente. Tíbia anterior distintamente curva, mormente na sua parte apical; quase roliça na base, distintamente comprimida apicalmente. Tíbia mediana fortemente curva, distintamente comprimida na sua parte apical. Tíbia posterior quase reta, ligeiramente comprimida na região basal.

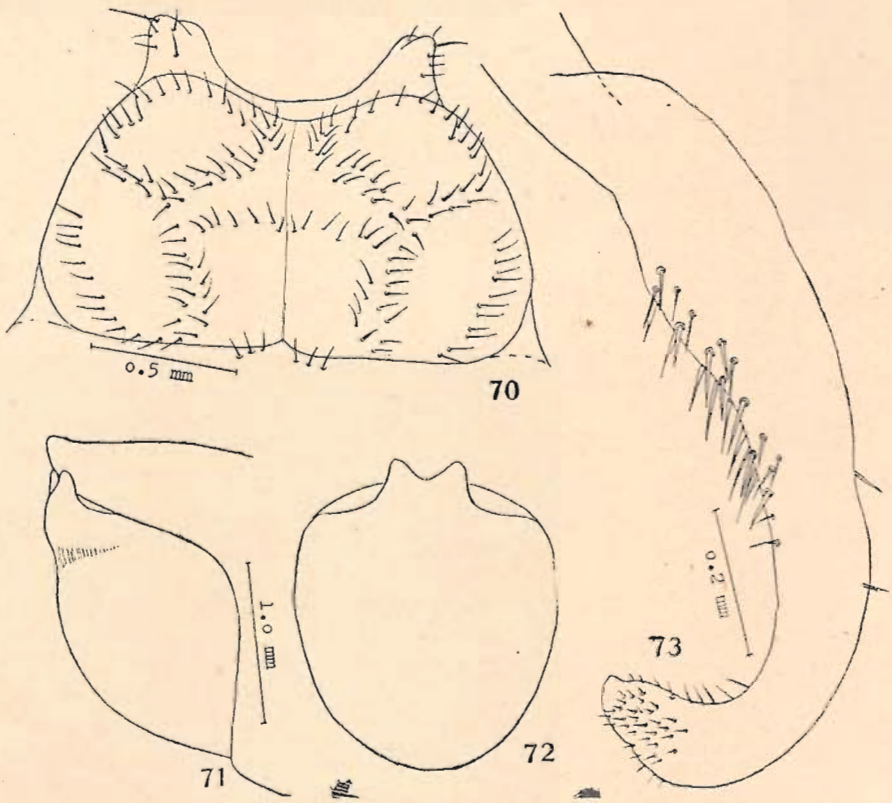
também se parece com *H. lenti*, descrita a seguir; podemos distinguir as duas espécies fàcilmente pelo feitio dos ângulos ântero-laterais do colarinho, como indicado em nossa chave, e principalmente pela genitália do macho, inteiramente diferente.

Temos grande prazer em dedicar esta espécie ao Dr. DARIO MENDES, chefe da Seção de Entomologia Agrícola do I. E. E. A., que tudo fêz para nos facilitar a execução do presente trabalho.

Heniartes flavicans (Fabricius, 179[illegible])

(figs. 74-86, 198)

Comprimento total da ♀ 19.0, do ♂ 17.0--18.0 mm; largura máxima do pronoto da ♀ 4.5, do ♂ 4.0 mm; largura máxima do abdômen da ♀ 5.0, do ♂ 4.0 mm. Corpo muito estreito e alongado, com



Heniartes mendesi n. sp., ♂ — Fig. 70. Pronoto, com cerdas, aspecto dorsal. — Fig. 71. Ápice do abdômen, aspecto lateral. — Fig. 72. Hipopígio, aspecto ventral. — Fig. 73. Clásper. — Wygodzinsky del.

Genitália como em *tumatumari;* cerdas da face ventral do clásper curtas e fortes, ligeiramente mais compridas do que naquela espécie, porém ainda muito mais curtas do que o comprimento do diâmetro do clásper. Aedeagus exatamente como em *tumatumari*.

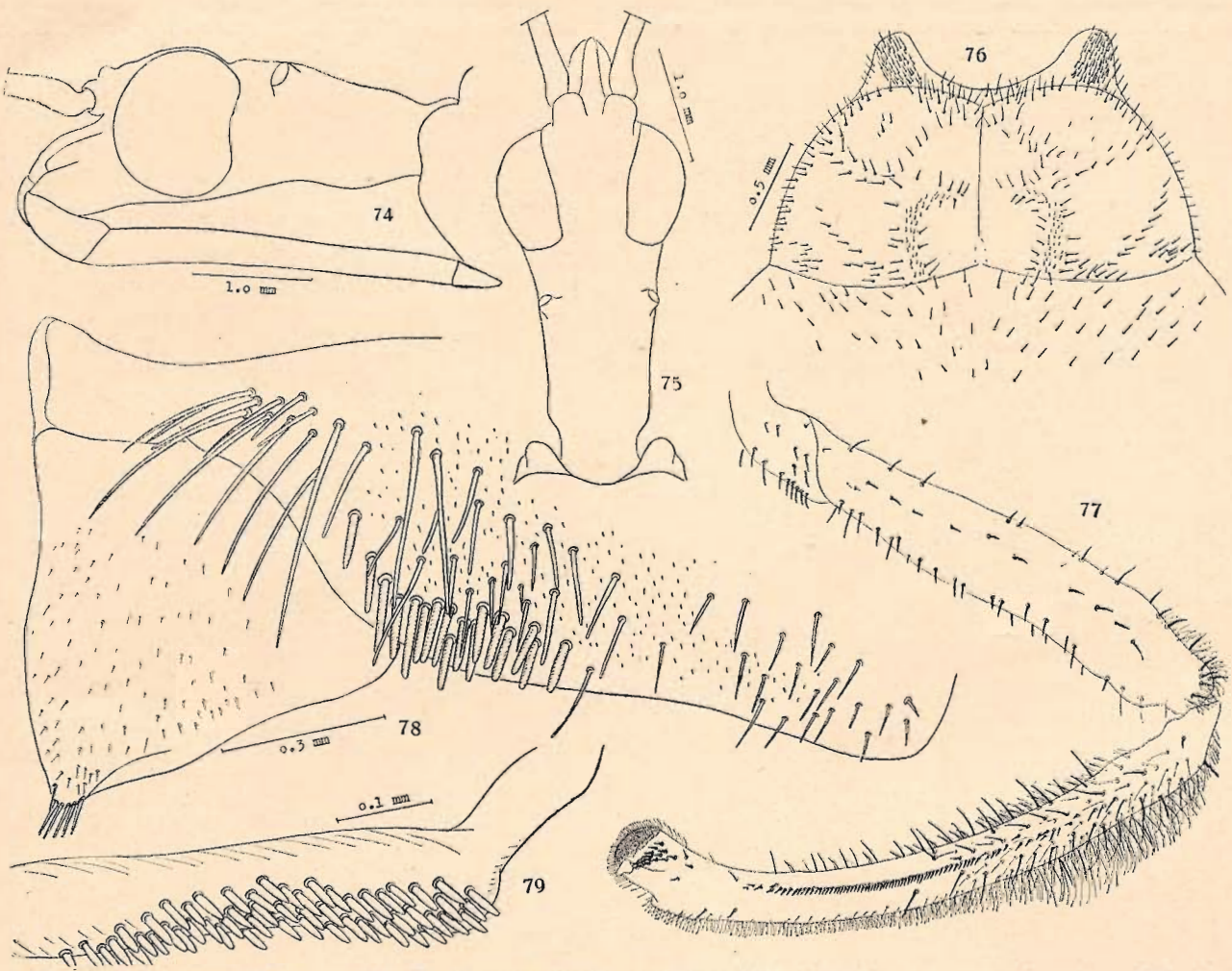
Distribuição: La Chorrera to La Sombra, Putumayo Dist., Peru, 21-8-1920, Cornell University Expedition col. (1 ♂, holótipo, Cornell); Rio Caiary, Uaupés, Amazonas, Brasil, 1906, H. Schmidt col. (1 ♂, I. E. E. A.).

A nova espécie está indubitàvelmente muito próxima de *H. tumatumari*, diferindo desta quase exclusivamente pelas cerdas do lobo anterior do pronoto, que são de um tipo só. Pelo aspecto geral, a espécie os hemélitros lanceolados, alongados, conforme figura 198.

Colorido: Antenas pretas, base do 3º artículo com 1 estreito anel amarelado, cujo comprimento corresponde a 1/7-1/5 do comprimento total do artículo. Face ventral da metade basal do 2º artículo do rostro amarelada, existindo às vêzes também uma pequena mancha clara na base da face dorsal dêste artículo. Lobo anterior do pronoto de côr amarelado--alaranjada clara, lobo posterior do pronoto e o colarinho de colorido vermelho-alaranjado claro. Pleura, esternos, coxas e trocanteres da côr do lobo anterior do pronoto. Escutelo totalmente de colorido alaranjado claro. Cório de côr alaranjada clara mais ou

menos uniforme; a sua extremidade posterior preta, variando ligeiramente a extensão desta região escura. Fêmures de côr vermelho-alaranjada não muito clara, com 3 anéis de côr amarelada, nem sempre bem discerníveis, dos quais 1 em posição basal, 1 submediano e 1 subapical; êstes anéis bastante largos, o seu comprimento igual ou superior ao das partes escuras. Base das tíbias anteriores com 1 estreito anel escuro, seguido de 1 claro e um outro escuro, e ainda mais 1 claro, todos de comprimento subigual; os 2/3 restantes da tíbia anterior pretos. Tíbia mediana de colorido alaranjado não muito claro, com 2 anéis de um olho, neste aspecto. Comprimento do 1º artículo das antenas 3.2-3.5 mm; comprimento relativo dos artículos = 1 : 0.7 : 1.0-1.1 : 1.3.

Ângulos ântero-laterais do colarinho muito pouco salientes, arredondados, com uma área dorsal de numerosíssimos pêlos curtos e fortes. Lóbulos do lobo posterior muito pouco elevados, sem tubérculos apicais. Pêlos do lobo anterior delicados, relativamente curtos, bastante numerosos, arrumados conforme fig. 76; no lobo posterior igualmente delicados, sem arrumação definitiva. Escutelo de forma regular, não muito curto; crista mediana longitudinal



Heniartes flavicans (Fabr.) — Fig. 74. Cabeça, aspecto lateral. — Fig. 75. Cabeça, aspecto dorsal. — Fig. 76. Pronoto com cerdas, aspecto dorsal. — Fig. 77. Perna mediana, face interna (sem tarso). — Fig. 78. Gonapófise anterior da fêmea, com lobo do 8º esternito. — Fig. 79. Gonapófise posterior. — Wygodzinsky del

amarelados bastante longos, dos quais 1 basal e 1 submediano. Tíbia posterior do colorido da mediana, porém com o quarto ou quinto distal píceo escuro ou preto. Face ventral do abdômen de colorido amarelo-alaranjado claro uniforme, inclusive a região genital em ambos os sexos. Conexivo manchado de amarelo e castanho escuro, sendo as manchas escuras nem sempre muito distintas, e ocupando cêrca de 1/2 da área total do respectivo segmento do conexivo.

Aspecto da cabeça conforme figs. 74 e 75. Parte anterior não muito larga. Comprimento do espaço postocular, na vista dorsal, do dobro do comprimento

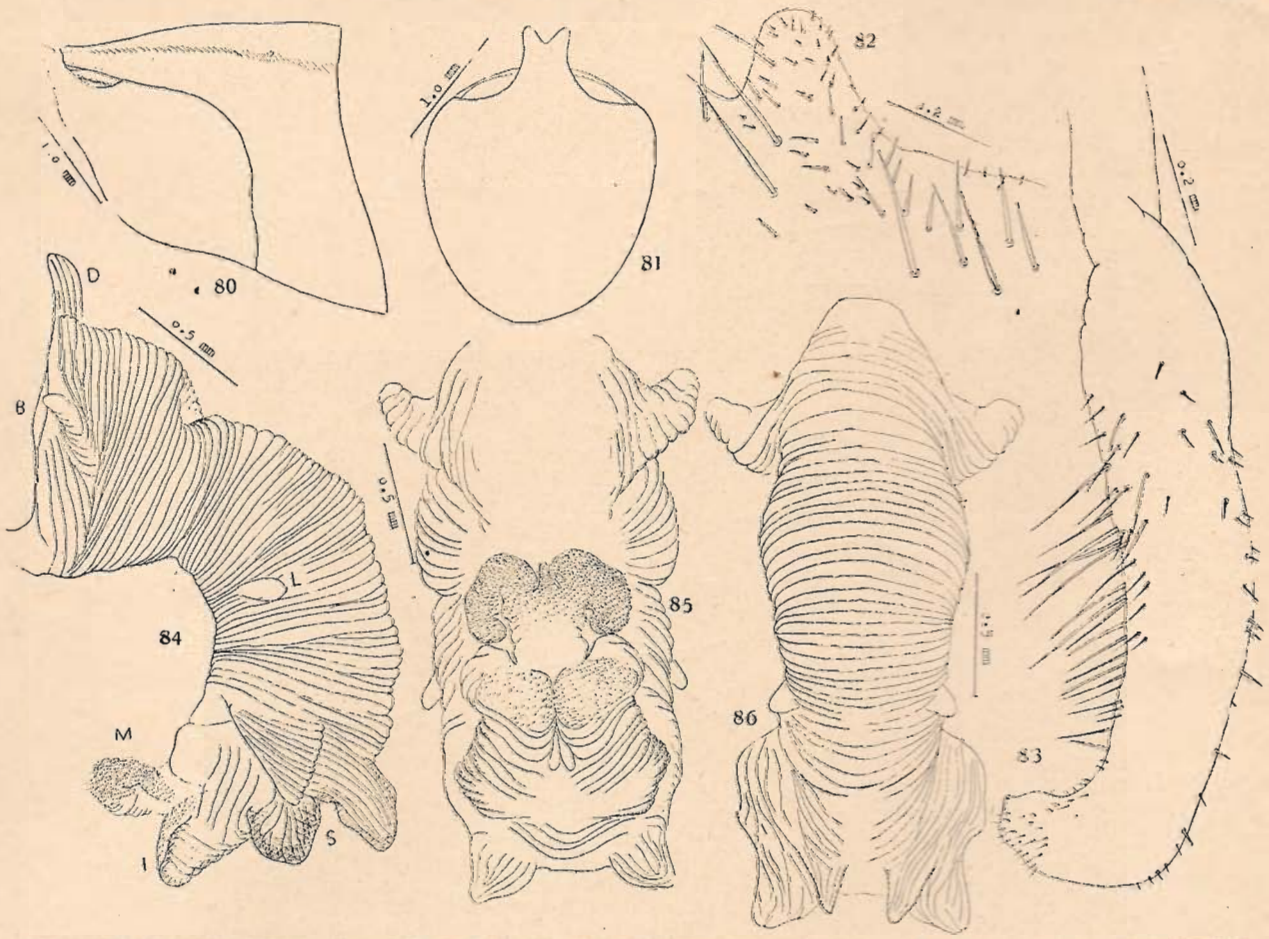
distinta posteriormente. Tíbia anterior ligeiramente curva, ligeiramente comprimida em todo o seu comprimento, mormente na parte apical. Tíbia mediana bastante curva, muito ligeiramente comprimida. Tíbia posterior ligeiramente curva, distintamente comprimida na sua parte basal.

Hemélitros muito alongados, ultrapassando o ápice do abdômen por 1.5-2.7 mm na ♀, e por 1.5-2.5 mm no ♂.

Genitália da fêmea: Lobo do 8º esternito conforme fig. 78, cerdas espiniformes do bordo anterior curtas e muito pouco numerosas; disco com macro-

quetas longas e bastante numerosas, alguns pêlos regulares e numerosíssimas microquetas muito curtas. Gonapófises anteriores conforme fig. 78, o seu tufo apical pequeno, formado de poucas cerdas fortes; disco com numerosos pêlos; ângulo basal interno liso. Conjunto das gonapófises posteriores arredondado, com 1+1 grupos de cerdas espiniformes, conforme fig. 79. Conjunto do 9º e 10º tergito como em *jaakkoi*.

Genitália do ♂: Forma do hipopígio conforme figs. 80 e 81; processos apicais triangulares, curtos, aproximados na sua base, arredondados apicalmente. Clásper não muito comprido, relativamente grosso, simples, a sua face ventral com numerosas cerdas finas, cujo comprimento quase atinge o do diâmetro do clásper. Aedeagus (figs. 84-86) grande, alongado; processo dorsal (D) pouco saliente, arredondado apicalmente, o envólucro não atingindo o seu ápice; processos basais laterais (B) grandes, muito salientes; placa ventral não discernível; processos laterais medianos (L) pequenos, mas bem destacados, hialinos; processos distais laterais superiores (S) bilobados, fortemente esclerosados; processos laterais distais inferiores (I) simples, hialinos; processo distal mediano inferior (M) conforme figuras.



Heniartes flavicans (Fabr.), ♂ — Fig. 80. Ápice do abdômen, aspecto lateral. — Fig. 81. Hipopígio, aspecto ventral. — Fig. 82. Processo distal do hipopígio. — Fig. 83. Clásper — Fig. 84. Aedeagus, aspecto lateral. — Figura 85. Aedeagus, aspecto ventral. — Fig. 86. Aedeagus, aspecto dorsal. — Wygodzinsky del

Distribuição: Demerara, Guiana Britânica, 27-5-1901, R. J. Grew col. (1 ♀, Cornell, 1 ♂ col. autor); Mackenzie, Demerara River, Guiana Britânica, 26-6-1927 (1 ♂, Cornell); Rocketone, Essequebo River, Guiana Britânica, 26-6-1927 (1 specimen, Cornell); Bartica, Bartica District, Guiana Britânica, W. Beebe col. (1 ♀, Beebe); West Bank, Demerara River, Guiana Britânica, 9-11-1923, W. Beebe col. (1 ♂, Beebe; 1 ♂, 1 ♀, col. autor); Taperinha, Pará, Brasil, 3-1916, G. Hagmann col. (1 ♂, Mus. Nac.); Maués, Amazonas, Brasil, 12-1936 (1 ♀, I. E. E. A.); Manaus, Rio Negro, Amazonas, Brasil, 19-12-1927, J. F. Zikán col. (1 ♀, col. J. F. Zikán); Uipiranga, Manaus, Rio Negro, Amazonas, Brasil, 10-1941, 12-1941 (2 ♂♂, Mus. Nac.), 10-1941, A. Parko col. (4 ♀♀, E. N. A., com o número 9.227); Uipiranga, Manaus, Amazonas, Brasil, 1942, A. Parko col. (1 ♂, 1 ♀, I.O.C. Lent; 1 ♀, col. autor); São Gabriel, Rio Negro, Amazonas, Brasil, 26-8-1927, 10-9-1927, 22-9-1927, J. F. Zikán col. (2 ♂♂, I. O. C., Lima; 1 ♀, na coleção Zikán); 8/10-1927, J. F. Zikán col. (1 ♂, 1 ♀, col. Zikan; 1 ♀, I. E. E. A.; 1 ♀, U. S. N. M.; 1 ♂, col autor).

Confessamos não ter certeza absoluta sôbre a completa unidade específica do material acima enumerado. O exame detalhado da genitália de ambos os sexos, em exemplares da mais variada procedência e em espécimens da mesma localidade, deixou de

revelar diferenças que justificassem uma separação do respectivo material. Não se devem, porém, tirar conclusões definitivas dêste fato, visto nem diferir a genitália de espécies próximas, como *putumayo* e *geijskesi*, da do complexo específico em mão.

Acreditamos que a análise de exemplares mais numerosos, executada por métodos mais adiantados do que os nossos, revelará caracteres específicos adicionais, que escaparam à nossa observação. Mencionamos, por exemplo, ter encontrado vários espécimens, capturados juntos com os que inteiramente correspondem à nossa descrição acima, e que não apresentam aparentemente pelinhos curtos nas faixas submedianas posteriores do lobo anterior do pronoto; ao mesmo tempo, as cerdas longas do lobo anterior do pronoto são mais fortes nestes exemplares aberrantes. Como se trata aqui de um caráter de dificílima observação, não ousamos basear nêle uma unidade taxonômica diferente. — Os pequenos pêlos que formam neste e em outras espécies uma área bem definida nos ângulos ântero-laterais do colarinho, são muito mais fáceis de observar, e, o que é importante, não se perdem em exemplares mal conservados; achamo-nos por isso justificados de basear a nossa espécie *putumayo*, que no restante dos caracteres se assemelha muito a *flavicans*, na ausência desta área.

Heniartes putumayo n. sp.

O único exemplar em mão é extremamente parecido com *H. flavicans*, diferindo desta espécie apenas pelos ângulos ântero-laterais do colarinho, nos quais se inserem apenas cerdas isoladas, e onde não se encontram, como na espécie anterior, campos de cerdas curtas. As faixas submedianas da região posterior do lobo anterior do pronoto são compostas apenas de cerdas longas, não existindo pelinhos curtos, observados na maioria dos exemplares de *flavicans*.

O comprimento total do exemplar (16 mm), distintamente menor do que o que se encontra em *flavicans* (17-18 mm, no macho), talvez seja outro sinal de diferença específica.

Distribuição: El Encanto, Putumayo District, Peru, 25-8-1920, Cornell University Expedition col. (1 ♂, holótipo, Cornell).

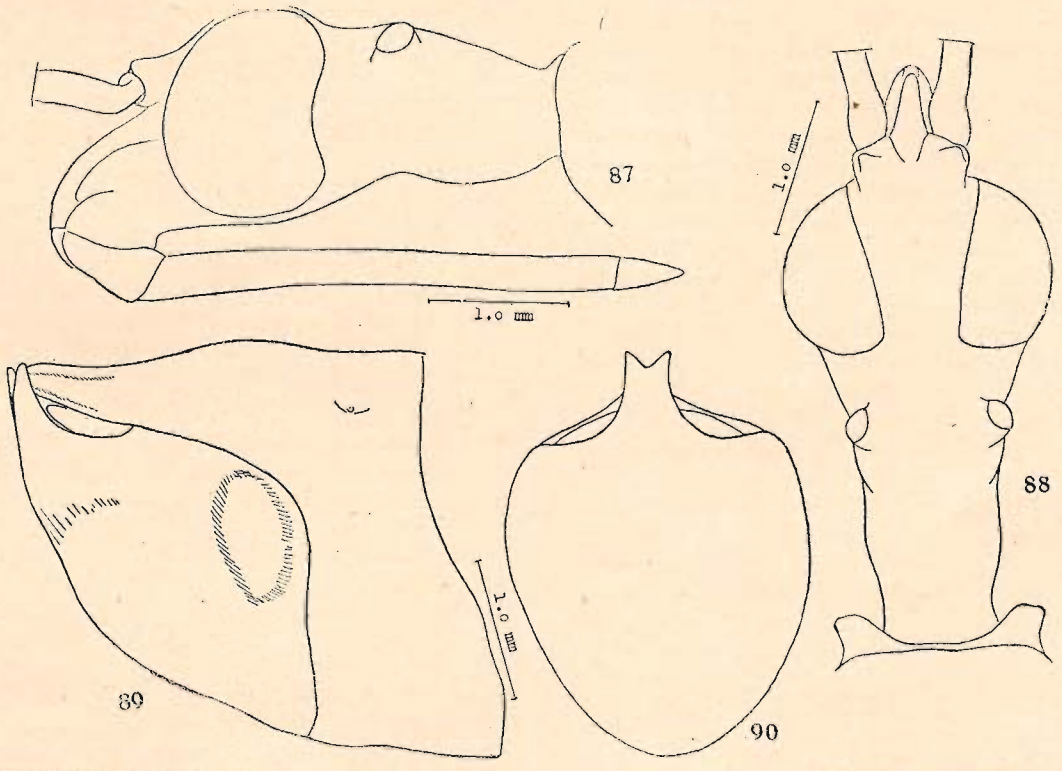
Heniartes geijskesi n. sp.

(figs. 87-90, 199)

Macho.

Comprimento do corpo 20.5 mm; largura máxima do pronoto 5.5, do abdômen 4.8 mm. Corpo forte, alongado, conforme fig. 199.

Colorido: Antenas pretas, a base do 3º artículo com anel amarelo esbranquiçado basal, cujo comprimento corresponde a cêrca de 1/5 do comprimento total do artículo. Face ventral da base do 2º artículo do rostro amarelada. Lobo anterior do pronoto e o colarinho de côr pícea muito escura, lobo posterior do pronoto de côr pícea mais clara; pleura, esternos e coxas do mesmo colorido. Parte elevada do escutelo preta, parte posterior de côr pícea bastante escura, o seu ápice amarelado. Cório de colorido castanho-avermelhado bastante escuro, com uma pequena região amarela esbranquiçada subapical; a extremidade posterior preta, como é a membrana. Fê-



Heniartes geijskesi n. sp., ♂ — Fig. 87. Cabeça, aspecto lateral. — Fig. 88. Cabeça, aspecto dorsal — Fig. 89. Ápice do abdômen, aspecto lateral. — Fig. 90. Hipopígio, aspecto ventral. — Wygodzinsky del

mures de côr pícea quase preta na sua parte basal, ligeiramente mais claros na sua parte apical, com 1 anel amarelado extremamente estreito em posição submediana, e 1 outro, mais comprido, em posição subapical; não existem nem traços de anel basal ou sub-basal. Tíbias de côr pícea bastante escura, com a base de côr pícea mais clara, e 1 anel submediano de colorido amarelado, bastante curto nas tíbias anteriores e medianas, bem comprido na tíbia posterior, porém ali interrompido por 1 largo anel escuro. Face ventral do abdômen de colorido castanho claro uniforme, hipopígio da mesma côr. Conexivo manchado de claro e escuro, ocupando as manchas escuras cêrca de 4/5 da área total dos respectivos segmentos conexivais.

Cabeça conforme figs. 87 e 88; muito larga anteriormente, olhos muito grandes. Comprimento do espaço postocular, na vista dorsal, distintamente menor do que o dobro do comprimento de um olho, neste aspecto. Comprimento do 1º artículo das antenas 4.5 mm; comprimentos relativos dos artículos = 1 : 0.7 : 1.1 : ?.

Ângulos ântero-laterais do colarinho pouco salientes, arredondados, com área de numerosíssimos pêlos curtos. Lobo anterior do pronoto com os lóbulos muito pouco elevados, sem tubérculos apicais. Pêlos do lobo anterior (poucos ainda presentes) aparentemente bastante longos; número e distribuição? Escutelo de forma regular, aguçado, a crista longitudinal mediana distinta posteriormente. Tíbia anterior ligeiramente curva, distintamente comprimida em todo o seu comprimento. Tíbia mediana pouco curva. Tíbia posterior quase reta, distintamente comprimida na sua parte basal. Hemélitros longos, lanceolados, ultrapassando o ápice do abdômen por pouco mais do que 1 mm.

Genitália: Forma do hipopígio conforme figuras 89-90; saliência apical bastante alongada; processos distais curtos, triangulares. Clásper e aedeagus como os de *flavicans*.

Distribuição: Tafelberg, Suriname, 6-11-1943, Geijskes col. (1 ♂ holótipo, I. O. C., Lent).

Esta espécie, muito parecida com *flavicans*, pode ser fàcilmente distinguida pela coloração peculiar dos fêmures, e pelo tamanho consideràvelmente maior dos olhos. Temos prazer em dedicar esta espécie ao colecionador, o nosso amigo Dr. D. C. GEIJSKES, que muito tem feito para o progresso dos conhecimentos entomológicos sôbre a Guiana Holandesa.

Heniartes productus Stal, 1866

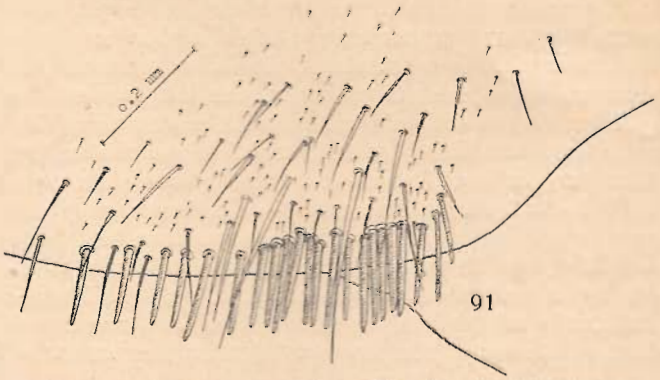
Depois de ter concluído o presente trabalho, pudemos ainda examinar o tipo de *Heniartes productus* Stal, devido à extraordinária gentileza do Dr. R. MALAISE, do Museu de Stockholm. Publicaremos mais tarde um estudo detalhado sôbre êste inseto, que difere de *H. scutellatus* n. sp., aqui descrito, pelos caracteres indicados na nossa chave.

Heniartes scutellatus n. sp.

(figs. 91, 200-201)

Distribuição: Desconhecida, por têrmos extraviado o respectivo rótulo, mas seguramente da região amazônica (1 ♀, holótipo, Cornell).

O único exemplar em mão, uma fêmea de 20 milímetros de comprimento, corresponde em todos os detalhes às fêmeas examinadas de *Heniartes flavicans* F., diferindo apenas pela região anterior da cabeça mais larga, pelo escutelo excessivamente prolongado apicalmente, comprimido no sentido dorso-ventral e pelos lobos do 8º esternito, que não possuem o grupo de macroquetas na parte interna do bordo posterior, que são tão características de *flavicans*. A relação dos comprimentos dos artículos da antena é igual a 1 : 0.5 : 1.0 : ?, e o anel claro basal



Heniartes scutellatus n. sp., ♀ — Fig. 91. Bordo posterior do lobo do 8º esternito — Wygodzinsky del.

do 3º artículo ocupa cêrca de 1/3 do comprimento total dêste artículo.

Heniartes lenti n. sp.

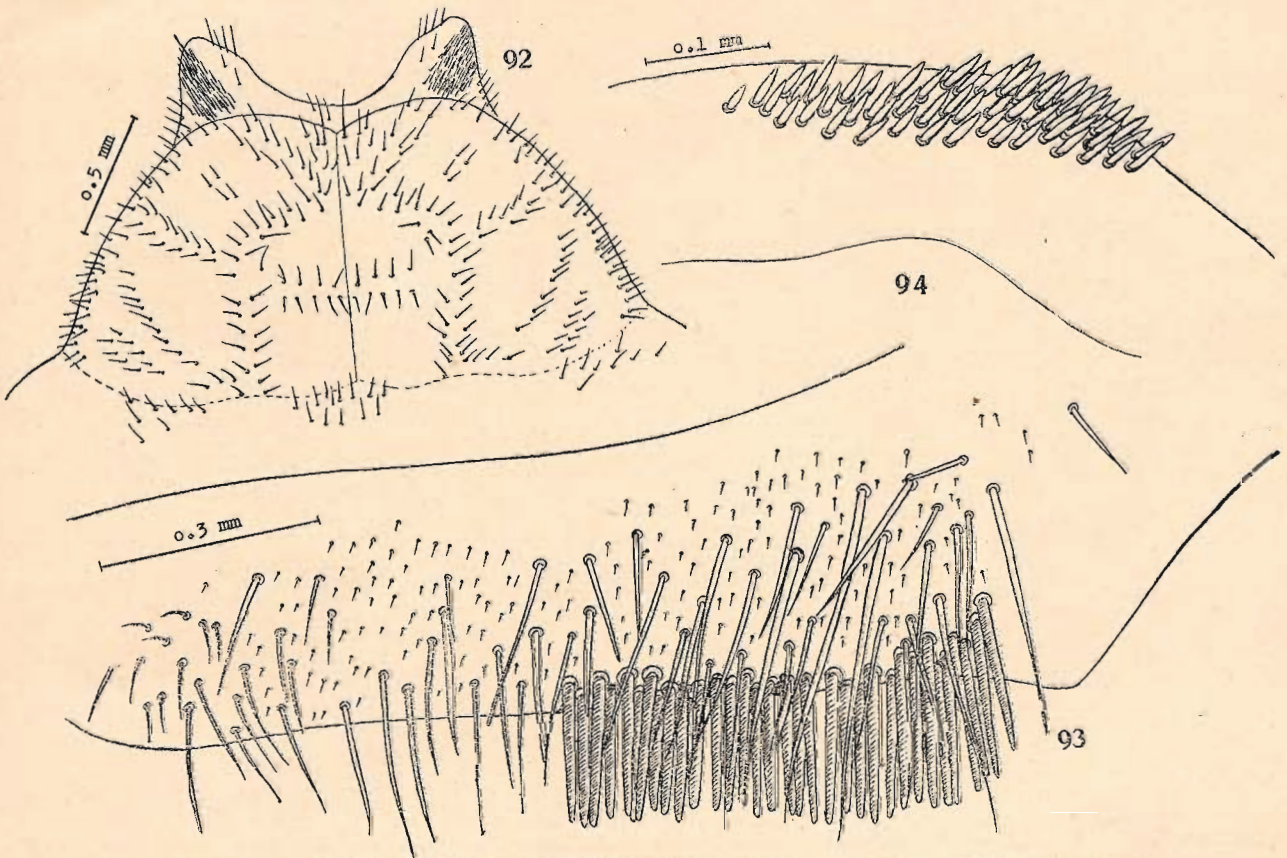
(figs. 92-101, 202)

Comprimento total 19.0-19.5 na ♀, 17.5 mm no ♂; largura máxima do pronoto 5.0 mm na ♀, 4.5 mm no ♂; largura do abdômen 4.5 mm na ♀, 4 mm no ♂. Corpo bastante alongado, feitio geral conforme fig. 202.

Colorido: Antenas pretas, base do 3º artículo com um anel esbranquiçado, bastante estreito, cujo comprimento corresponde no máximo a 1/5 do comprimento total do artículo. Rostro preto, a face ventral da parte basal amarelada. Pronoto de côr vermelho-alaranjada, sendo o colarinho e a parte anterior e central do lobo anterior do pronoto às vêzes enfuscados. Pleura, esternos e coxas da mesma côr. Parte elevada do escutelo de côr escura, parte posterior de colorido vermelho-alaranjado claro, a crista mediana e o ápice do escutelo geralmente amarelos. Cório vermelho-alaranjado, sendo a extremidade posterior muito ligeiramente enfuscada. Fêmures de côr castanha não muito escura, com 3 anéis amarelados relativamente largos: 1 basal, 1 submediano e 1 subapical. Base das tíbias com 1 estreito anel castanho, seguido de um largo anel amarelado, interrompido no seu meio por 1 anel escuro mais ou menos distinto. Parte restante das tíbias de côr quase preta nos pares anterior e posterior, e pícea não muito escura nas tíbias medianas, ocupando esta região escura cêrca de 1/2 da tíbia anterior e mediana, e cêrca de 1/3 da tíbia posterior. Face ventral do abdômen vermelho-alaranjada uniforme, inclusive a região genital da ♀; hipopígio do macho de côr amarelada. Conexivo manchado de claro e escuro,

ocupando as manchas escuras a metade da área total do respectivo segmento do conexivo.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.5 mm; comprimentos relativos dos artículos = 1 : 0.6-0.7 : 1.0-1.1 ' 1.2-1.3. Ângulos ântero-laterais do colarinho bastante salientes e fortes, arredondados, com campo de numerosíssimos pêlos muito curtos. Lobo anterior do pronoto com os lóbulos ligeiramente elevados, sem tubérculos apicais; pêlos do lobo anterior do pronoto, de comprimento médio, arrumados em fileiras e faixas, conforme fig. 92. Pêlos do lobo posterior do pronoto re-



Heniartes lenti n. sp., ♀ Fig. 92. Pronoto com cerdas, aspecto dorsal. — Fig. 93. Lobo do 8º esternito. — Fig. 94. Gonapófise posterior. — Wygodzinsky del.

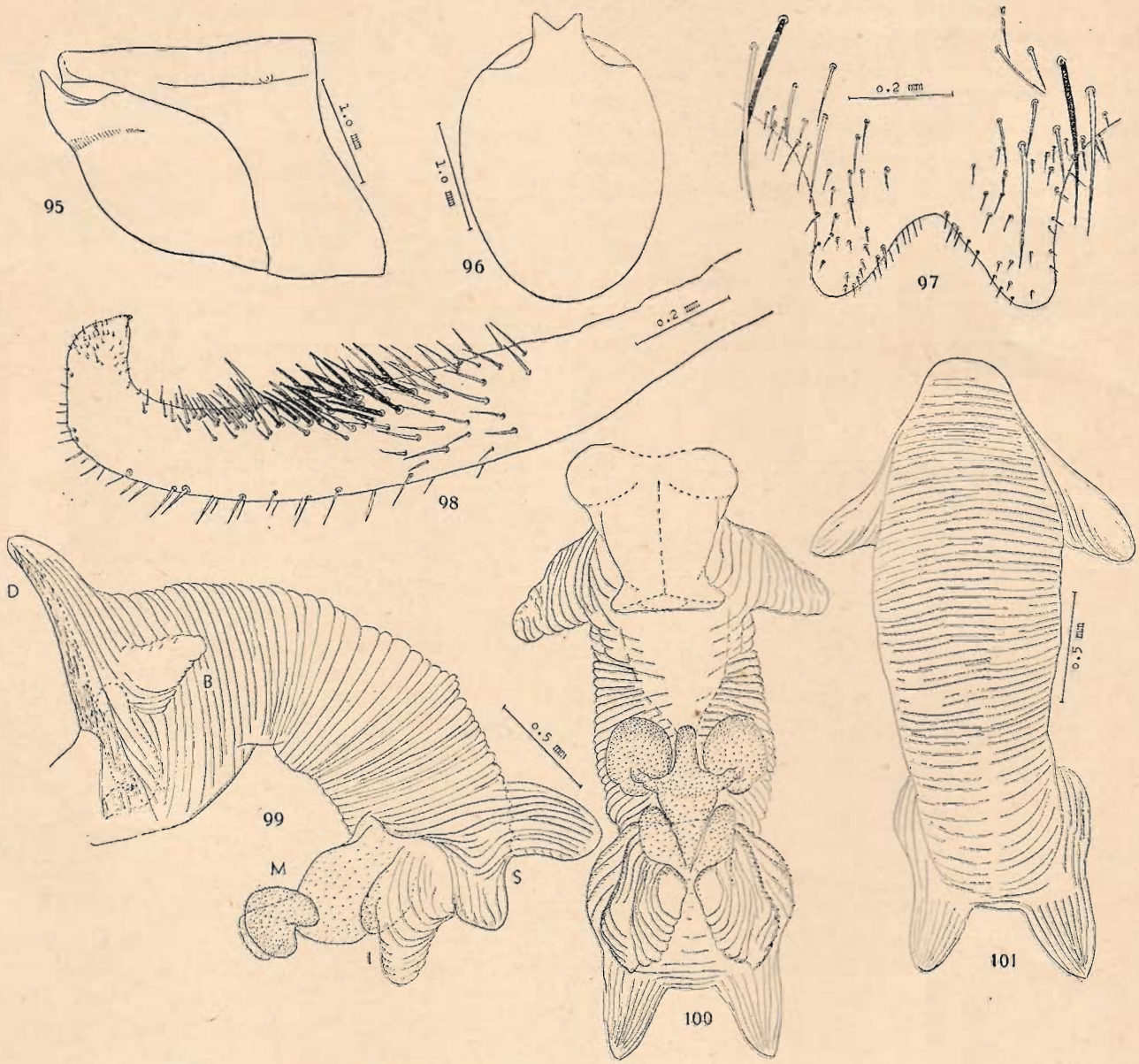
lativamente curtos, não muito numerosos, sem arrumação definida. Escutelo de forma regular, subagudo, ligeiramente elevado posteriormente, com a crista mediana longitudinal distinta. Tíbia anterior ligeiramente curva, distintamente comprimida em todo o seu comprimento. Tíbia mediana bastante curva, ligeiramente comprimida. Tíbia posterior quase reta, bastante comprimida na sua parte basal.

Genitália da ♀ como em *flavicans*, porém com as cerdas espiniformes do bordo anterior dos lobos do 8º esternito muito mais numerosas, e os 1+1 grupos formados pelas cerdas espiniformes nas gonapófises posteriores ligeiramente mais curtos.

Genitália do ♂ : Forma geral do hipopígio conforme figs. 96 e 97; saliência apical de comprimento médio; processos apicais curtos, triangulares, subarredondados, aproximados na sua base, afastados apicalmente. Clásper alongado, bem caracterizado pelo grande número das cerdas da face ventral, de comprimento médio, entre as quais se acham numerosas fortemente esclerosadas, quase pretas. Aedeagus (figs. 99-101) grande, alongado; processo dorsal (D) simples, o envólucro atingindo o seu ápice; processos laterais basais (B) distintos, fortes; placa ventral não discernível; processos terminais não esclerosados, hialinos, o lateral superior (S) bilobado; o lateral inferior (I) simples; o inferior mediano (M) de estrutura complexa.

Distribuição: El Campamiento, Col. Perene, Peru, 6-1920, Cornell University Expedition col. (1 ♂ holótipo, 1 ♀ alótipo, Cornell; 1 ♀ parátipo, I. O. C. Lent; 1 ♂ parátipo, col. autor); La Chorrera, Putumayo Dist., Peru, 17/20-8-1920, Cornell University Expedition col. (1 ♂, Cornell); Iquitos. Peru, 8-5-1930, H. S. Parish col. (1 ♂, Cornell); Chanchamayo, Peru, W. F. H. Rosenberg col. (1 ♂, U. S. N. M.).

Temos prazer especial em dedicar esta bela espécie ao nosso colega e caro amigo Dr. HERMAN LENT.



Heniartes lenti n. sp., ♂ — Fig. 95. Ápice do abdômen, aspecto lateral. — Fig. 96. Hipopígio, aspecto ventral. — Fig. 97. Processo apical do hipopígio. — Fig. 98. Clásper. — Fig. 99. Aedeagus, aspecto lateral. — Figura 100. Aedeagus, aspecto ventral. — Fig. 101. Aedeagus, aspecto dorsal. — Wygodzinsky del

Heniartes beebei n. sp.

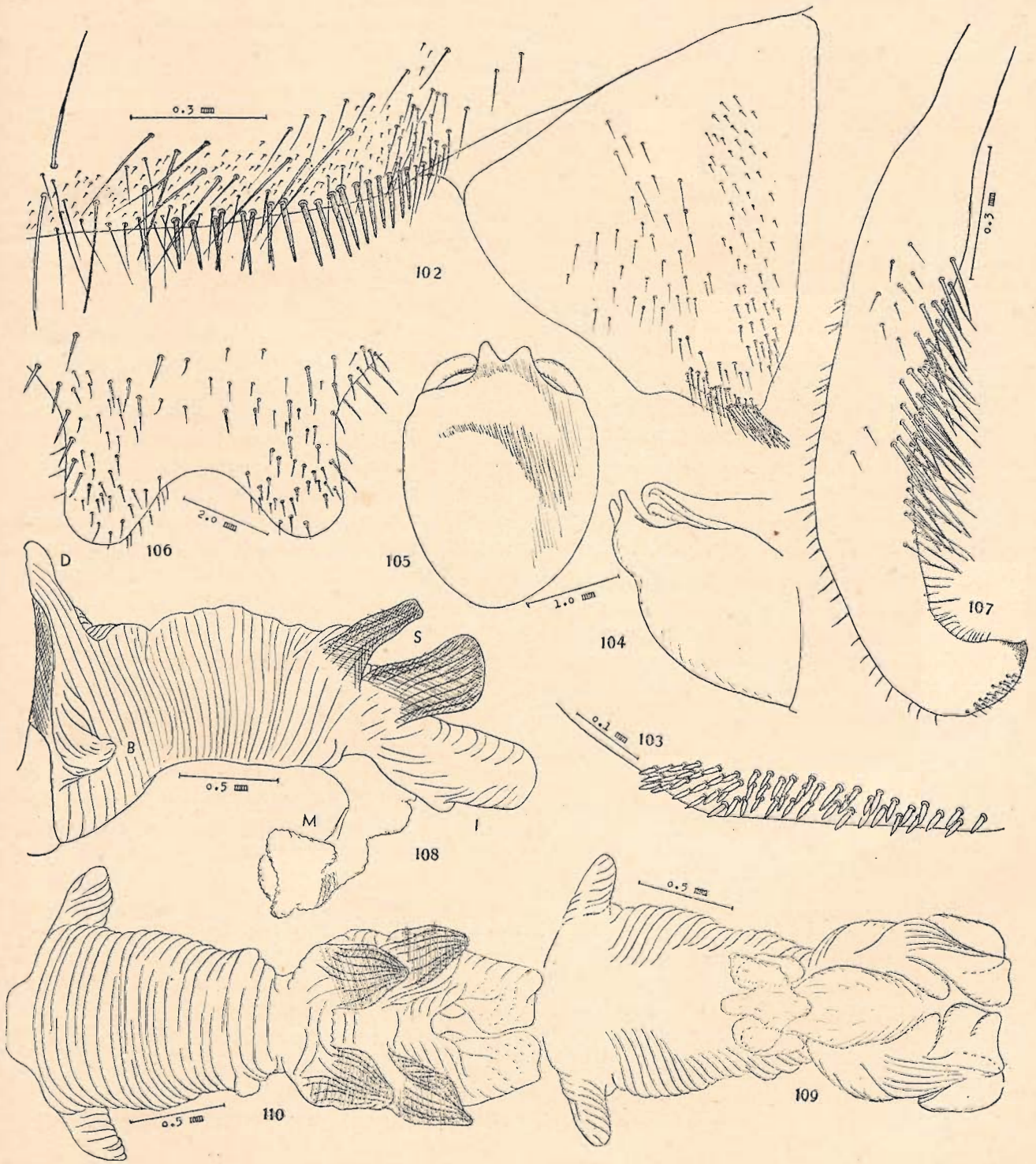
(figs. 102-110, 203)

Comprimento do corpo 17-18 mm; largura máxima do pronoto 4.5 mm; largura máxima do abdômen 4 mm. Forma geral do corpo conforme fig. 203.

Colorido: Antenas pretas, base do 3º artículo de colorido amarelado, às vêzes dificilmente distinguível da parte escura. Rostro de colorido uniformemente píceo escuro. Colarinho píceo escuro ou preto; lobo anterior e posterior do pronoto de côr vermelho-alaranjada clara, o lobo anterior com algumas regiões enfuscadas. Pleura, esternos e coxas do colorido do pronoto, às vêzes a metapleura enfuscada. Parte elevada do escutelo pícea escura ou preta, parte posterior da côr do pronoto. Cório de colorido vermelho-alaranjado bastante escuro na parte anterior, ficando mais claro para trás, sendo as regiões claras e escuras não delimitadas nitidamente. Fêmures de colorido vermelho escuro, com 1 distinto anel amarelado claro em todos os pares, de posição submediana, existe também, porém raramente distinto, 1 anel claro sub-basal e 1 subapical, escapando êstes anéis fàcilmente à observação. Tíbias de colorido píceo escuro, de côr vermelha muito escura na sua base, e com um anel claro submediano, porém raramente bem discernível. Abdômen ventralmente de colorido castanho sujo mais ou menos uniforme; hipopígio de colorido castanho-alaranjado uniforme. Conexivo manchado de claro e escuro, ocupando as manchas escuras mais do que a metade da área total dos respectivos segmentos conexivais.

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.5 mm; comprimentos relati-

vos dos artículos = 1 : 0.7 : 1.1 : 1.1. Ângulos ântero-laterais do colarinho não muito salientes, subagudos, apenas com algumas cerdas isoladas. Lobo anterior do pronoto com os lóbulos pouco elevados, anterior ligeiramente curva, distintamente comprimida em todo o seu comprimento; tíbia mediana bastante curva, tíbia posterior quase reta, distintamente comprimida na sua parte basal.



Heniartes beebei n. sp. — Fig. 102. Bordo posterior do lobo do 8º esternito da ♀, com gonapófise anterior. — Fig. 103. Grupo de cerdas espiniformes da gonapófise posterior. — Fig. 104. Ápice do abdômen do macho aspecto lateral. — Fig. 105. Hipopígio do ♂, aspecto ventral. — Fig. 106. Processo distal do hipopígio. — Figura 107. Clásper. — Fig. 108. Aedeagus, aspecto lateral. — Fig. 109. Aedeagus, aspecto ventral. — Fig. 110. Aedeagus, aspecto dorsal. — Wygodzinsky del.

sem tubérculos apicais; pêlos do lobo anterior e do posterior (não muito bem conservados) de comprimento médio, extremamente pouco numerosos. Tíbia

Genitália da ♀ parecida com a de *flavicans*. Cerdas espiniformes do bordo anterior dos lobos do 8º esternito pouco numerosas, relativamente delica-

das; macroquetas e pêlos do disco bastante finos. Gonapófises anteriores (fig. 102) com os pêlos do disco bastante longos e numerosos. Gonapófises posteriores com 1+1 faixas muito estreitas de cerdas espiniformes pouco numerosas.

Genitália do ♂: Forma do hipopígio conforme figs. 104-105; saliência apical curta e larga; processos apicais curtos, triangulares, arredondados apicalmente, bastante afastados entre si. Clásperes longos, na sua face ventral com uma longa faixa de cerdas delicadas muito numerosas, cujo comprimento quase atinge o do diâmetro do clásper. Aedeagus (figuras 108-110) grande, alongado; processo dorsal arredondado apicalmente (D), o envólucro não atingindo o seu ápice; processos laterais basais (B) distintos, fortes; placa ventral não distinta; processo distal lateral superior (S) bilobado, sendo os dois lobos de tamanho distintamente diferente, fortemente esclerosado; processo lateral distal inferior (I) membranoso, simples; processo distal inferior mediano (M) de estrutura complexa.

Distribuição: Bartica District, Guiana Britânica, W. Beebe col. (♂ holótipo, ♀ parátipo, U. S. N. M.): Mattapicca strand, Suriname, 20-10-1940, Geijskes col. (♀ alótipo, I. E. E. A.); Paramaribo, Suriname, Bot. Garden, 16-12-1939, Geijskes col. (1 ♂, col. autor).

A espécie, que pertence ao grupo *flavicans*, difere das espécies, que possuem o cório inteiramente avermelhado, *lenti* e *tumatumari*, pelo colorido muito característico dos fêmures, que são muito escuros e possuem pràticamente 1 único anel claro visível apenas, e por outros caracteres.

Temos grande prazer em dedicar esta espécie ao grande biólogo norte-americano WILLIAM BEEBE.

Heniartes demerara n. sp.

(figs. 111-116)

Macho.

Comprimento total 17 mm; largura máxima do pronoto 4.5, do abdômen 3.5 mm. Corpo alongado, com os hemélitros lanceolados.

Colorido: Antenas pretas, o 3º artículo com longo anel esbranquiçado basal, cujo comprimento corresponde a 1/4 do comprimento total do artículo. Ápicve do 1º e a metade basal do 2º artículo do rostro amarelados, as partes restantes de colorido píceo não muito escuro. Colarinho e pronoto de colorido vermelho-alaranjado bastante claro, enfuscada a parte central do lobo anterior do pronoto. Pleura, esternos e coxas da côr do pronoto. Parte elevada do escutelo escura, parte posterior clara. Cório de côr vermelho-alaranjada clara, a sua parte apical preta, como é a membrana. Fêmures de colorido castanho não muito escuro, com 3 anéis amarelados: 1 subbasal, 1 submediano e 1 subapical, distintos em todos os pares. Base das tíbias com 1 estreito anel castanho escuro, seguido de 1 largo anel amarelado, interrompido no seu meio por 1 anel escuro mais ou menos distintamente visível; parte restante das tíbias de côr pícea escura ou preta, ocupando esta região escura na tíbia anterior um pouco mais, na mediana e posterior um pouco menos do que o comprimento total dêste artículo. Face ventral do abdômen amarelada, hipopígio da mesma côr. Cório manchado de amarelo e preto, ocupando as manchas pretas cêrca de 2/3 da área total dos respectivos segmentos conexivais.

Comprimento do 1º artículo das antenas 2,8 mm; comprimentos relativos dos artículos = 1 : 0.8 : 1.5 : ?

Ângulos ântero-laterais do colarinho muito pouco salientes, delicados, subarredondados, com um campo dorsal de numerosíssimos pêlos muito curtos. Lobo anterior do pronoto com os lóbulos bastante elevados, separados por uma incisão profunda, que é interrompida no meio. Pêlos do lobo anterior do pronoto muito curtos e numerosos, arrumados em faixas (não bem conservadas); pêlos do lobo posterior igualmente muito curtos e em número extraordinàriamente grande. Escutelo de forma regular, subagudo, a crista mediana longitudinal distinta posteriormente. Tíbia anterior ligeiramente curva, distintamente comprimida, mormente na parte apical. Tíbia mediana distintamente curva. Tíbia posterior muito pouco curva, ligeiramente comprimida na sua parte basal.

Genitália: Saliência apical do hipopígio relativamente curta e larga; processos apicais subtriangulares, extremamente curtos, aproximados na sua base. Clásperes relativamente fortes, na sua face interna com cerdas em número regular, fortes e compridas, cujo comprimento corresponde ao do diâmetro do clásper; algumas destas cerdas fortemente pigmentadas. Aedeagus (figs. 114-116) pequeno; envólucro não atingindo o ápice do processo dorsal; êste (D) inciso apicalmente. Processos laterais basais (B) em posição muito alta, bastante alongados e delgados. Placa ventral ausente. Existe apenas um par de processos terminais laterais (S), que são relativamente grossos, subarredondados apicalmente. Processo terminal inferior mediano (M) dividido em dois lobos divergentes, aguçados apicalmente.

Distribuição: West Bank, Demerara River, Guiana Britânica, 9-11-1923, W. Beebe col. (1 ♂, holótipo, U. S. N. M.).

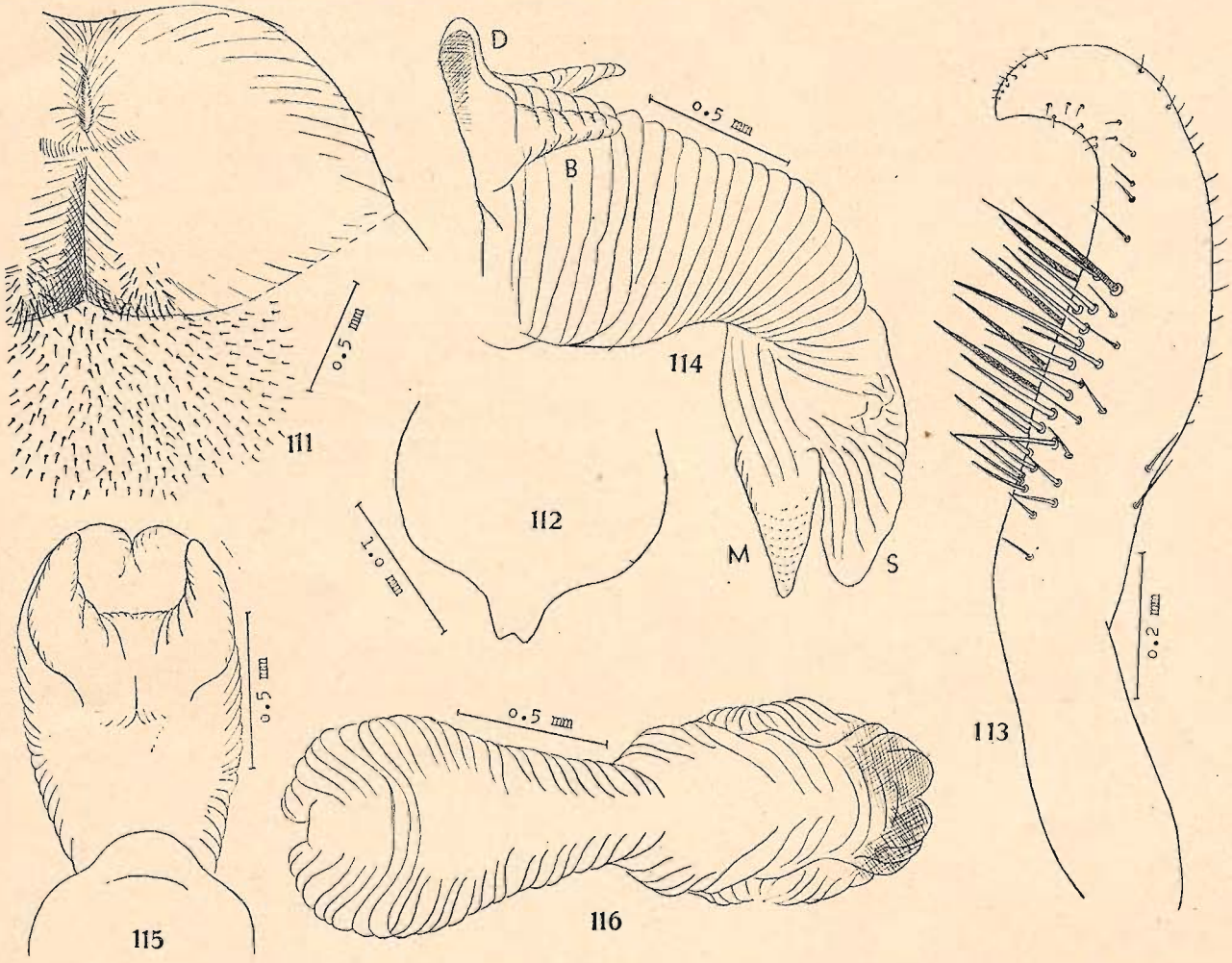
A espécie tem uma posição bastante isolada dentro das espécies amazônicas, formando um grupo à parte, principalmente pela genitália do macho, isto é, o aedeagus extremamente simples, que a separa de tôdas as espécies conhecidas do gênero. Lamentamos não conhecer os caracteres da fêmea, que certamente permitiriam uma colocação ainda mais exata dentro do gênero *Heniartes*.

Heniartes distinguendus n. sp.

(figs. 117-126, 204)

Comprimento total 13 mm na ♀, 12 mm no ♂; largura máxima do pronoto 3.5, do abdômen também 3.5 mm. Forma geral do corpo conforme fig. 204.

Colorido: Todos os artículos da antena de colorido uniformemente preto. Metade ou têrço basal do 2º artículo do rostro amarelado. Pronoto vermelho-alaranjado escuro; colarinho e a região central do lobo anterior do pronoto pretos, assim como a parte posterior e póstero-lateral do lobo posterior, incluindo os ângulos umerais. Escutelo preto, apenas na extremidade avermelhado. Propleura, prosterno, parte anterior do mesosterno e coxas de côr avermelhada; meso e metapleura, assim como a parte posterior do mesosterno e todo o metasterno, pretos. Clavo semi-hialino; cório de colorido vermelho-alaranjado uniforme, às vêzes a margem costal mais escura, e a parte posterior ligeiramente mais amarelada. Pernas pretas, com anéis amarelados ou alaranjados. Trocanteres pretos; fêmures de todos os pares com 1 anel submediano claro, o dos pares anteriores bastante estreito, o do par posterior do dobro do comprimento do anel das pernas anteriores. Tíbias com 1 anel submediano, o do par mediano o mais estreito, o comprimento do do par posterior correspondente a 1/3 do comprimento total da tíbia. Colorido geral da face ventral do abdômen preto; a região mediana dos segmentos anteriores, assim como a maior parte do 8º esternito na ♀, e todo o 7º esternito no ♂, de colorido avermelhado, genitália da ♀ de côr clara; hipopígio do ♂ de colorido vermelho-alaranjado claro, com uma mancha mediana em forma de Y, conforme fig. 121. Conexivo manchado de amarelo e preto.



Heniartes demerara n. sp., ♂ — Fig. 111. Parte do pronoto com cerdas, aspecto dorsal. — Fig. 112. Hipopígio, aspecto ventral. — Fig. 113. Clásper. — Fig. 114. Aedeagus, aspecto lateral. — Fig. 115. Aedeagus, aspecto ventral. — Fig. 116. Aedeagus, aspecto dorsal. — Wygodzinsky del.

Cabeça como em *maestralis*. Comprimento do 1º artículo das antenas 2.5 mm; comprimentos relativos dos artículos = 1 : 0.8 : 0.8 : 1.0. Ângulos ântero-laterais do colarinho curtos, mas bastante salientes. Lobo anterior do pronoto com os lóbulos bastante elevados, cada um apicalmente com um pequeno tubérculo. Pêlos do pronoto relativamente curtos e fortes, pouco numerosos, não formando faixas ou fileiras distintas. Escutelo de forma regular, subagudo, posteriormente com crista longitudinal mediana bastante elevada.

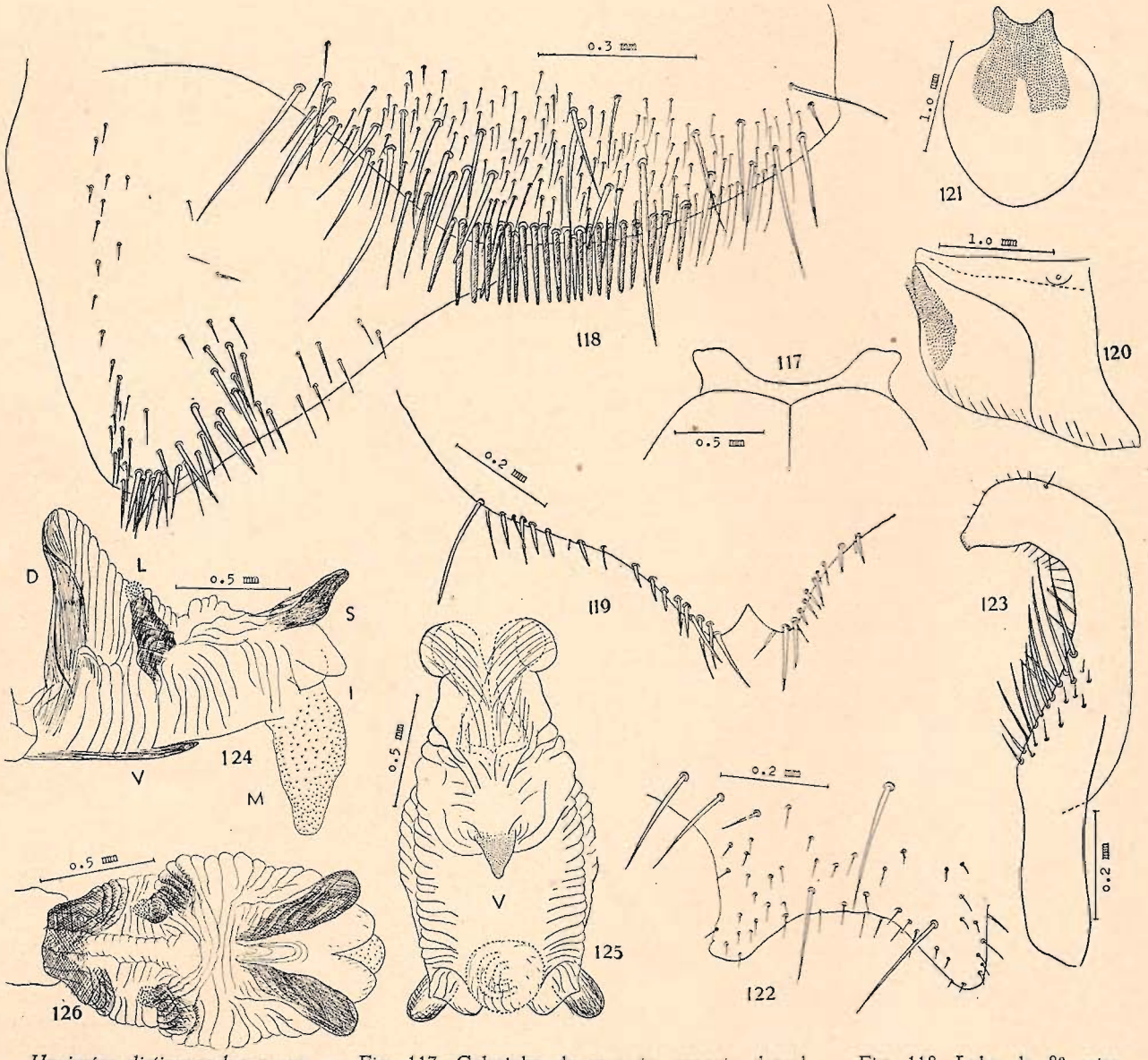
Pernas muito delicadas. Tíbia anterior pouco curva, roliça em todo o seu comprimento; tíbia me-

diana fortemente curva; tíbia posterior pouco curva, muito ligeiramente alargada e comprimida na sua parte basal; os pêlos longos e finos desta região pouco numerosos.

Hemélitros curtos, apenas atingindo o ápice do abdômen.

Genitália da ♀ parecida com a de *zikáni* (veja figs. 161-163). Cerdas espiniformes do bordo anterior dos lobos do 8º esternito bastante longas e numerosas; disco com macroquetas e pêlos em grande número. Cerdas espiniformes das gonapófises anteriores ocupando uma grande área, porém não muito numerosas. Conjunto das gonapófises posteriores (fig. 119) com profunda reentrância apical; as cerdas espiniformes marginais pouco numerosas. Conjunto do 9º e 10º tergito como em *zikáni* (veja figura 163), a área central sem cerdas além das macroquetas.

Genitália do ♂: Colorido do hipopígio descrito acima; seu processo apical largo e curto; saliências distais triangulares, curtas, subagudas, muito afastadas na sua base. Clásper de forma de foice, a sua face ventral com cerdas fortes e compridas, pouco numerosas. Aedeagus relativamente curto e grosso (figs. 124-126): envólucro atingindo o ápice do processo dorsal (D), êste simples; processos laterais basais não distintos; processo lateral submediano (L) composto de uma parte basal comprida, simples, fortemente esclerosada, e uma parte apical, de forma de glóbulo, denteado, também bastante esclerosado; placa ventral (V) distinta, triangular, o seu ápice livre; processos distais laterais superiores (S) bas-



Heniartes distinguendus n. sp. — Fig. 117. Colarinho do pronoto, aspecto dorsal. — Fig. 118. Lobo do 8º esternito da fêmea, com gonapófise anterior. — Fig. 119. Gonapófise posterior. — Fig. 120. Ápice do abdômen, aspecto lateral. — Fig. 121. Hipopígio, aspecto ventral. — Fig. 122. Processo distal do hipopígio. — Fig. 123. Clásper. — Fig. 124. Aedeagus, aspecto lateral. — Fig. 125. Aedeagus, aspecto ventral. — Fig. 126. Aedeagus, aspecto dorsal. — Wygodzinsky del.

tante alongados, fortemente esclerosados; processos distais laterais inferiores (I) curtos, simples, hialinos; processo terminal inferior mediano (M) simples.

Distribuição: Ecuador, sem localidade, F. Campos col. (1 ♂ holótipo, 1 ♀ alótipo, U. S. N. M.; 1 ♀ parátipo, col. autor).

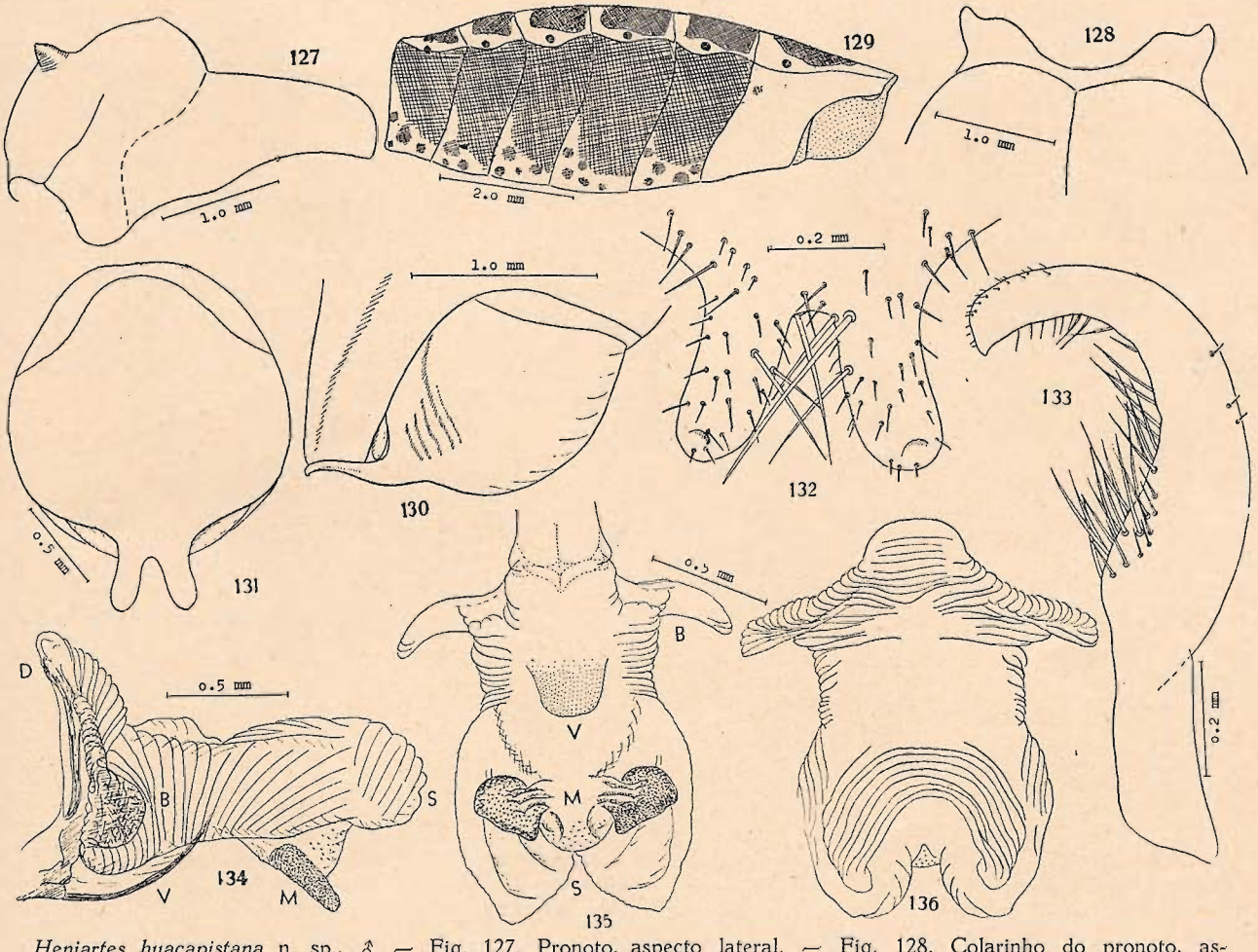
Heniartes huacapistana n. sp.

(figs. 127-136, 205)

Macho.

Comprimento total 14 mm; largura máxima do pronoto 4 mm; largura máxima do abdômen 3 mm. Espécie de forma geral relativamente delicada, conforme fig. 205.

Colorido: Todos os artículos da antena uniformemente pretos. Rostro preto, apenas a região basal do 2º artículo com ligeira tonalidade vermelha muito escura. Colarinho inteiramente preto; lobo anterior do pronoto de côr vermelho-alaranjada clara, a região central preta; lobo posterior do pronoto de côr vermelho-alaranjada clara nos ângulos ântero-laterais, sendo tôda a região anterior no meio e a posterior de colorido vermelho muito escuro até preto. Propleura, acetábula da mesopleura, pro e mesosterno, assim como as coxas, de colorido vermelho-alaranjado claro; meso e metapleura, assim como o metasterno, de colorido vermelho muito escuro ou preto. Escutelo preto, o seu ápice amarelado. Cório de côr vermelho-alaranjada bastante clara, ligeiramente mais escuro na base, e amarelado na sua extremidade posterior. Pernas pretas, brilhantes, com anéis amarelos ou alaranjados. Fêmures com 1 anel claro subapical, distante do ápice do artículo por pouco mais do que o seu próprio comprimento. Tíbias com largo anel claro submediano; na anterior, o comprimento do anel corresponde à sua distância da base do artículo; na tíbia mediana, a distância da base do artículo até o anel é ligeiramente maior do que o comprimento do último; na tíbia posterior, o anel ocupa 1/3 do comprimento total do artículo. Colorido da face ventral do abdômen amarelo-alaranjado claro, sendo a região central dos esternitos ornada de pequenas manchas escuras circulares, e a parte lateral dêstes esternitos pràticamente inteiramente preta, sendo apenas os estigmas, de côr preta, situados em pequenas zonas amarelas; 7º esternito



Heniartes huacapistana n. sp., ♂ — Fig. 127. Pronoto, aspecto lateral. — Fig. 128. Colarinho do pronoto, aspecto dorsal. — Fig. 129. Abdômen, aspecto lateral, com esquema da distribuição do colorido. — Fig. 130. Ápice do abdômen, aspecto lateral. — Fig. 131. Hipopígio, aspecto ventral. — Fig. 132. Processo distal do hipopígio. — Fig. 133. Clásper. — Fig. 134. Aedeagus, aspecto lateral. — Fig. 135. Aedeagus, aspecto ventral. — Figura 136. Aedeagus, aspecto dorsal. — Wygodzinsky del.

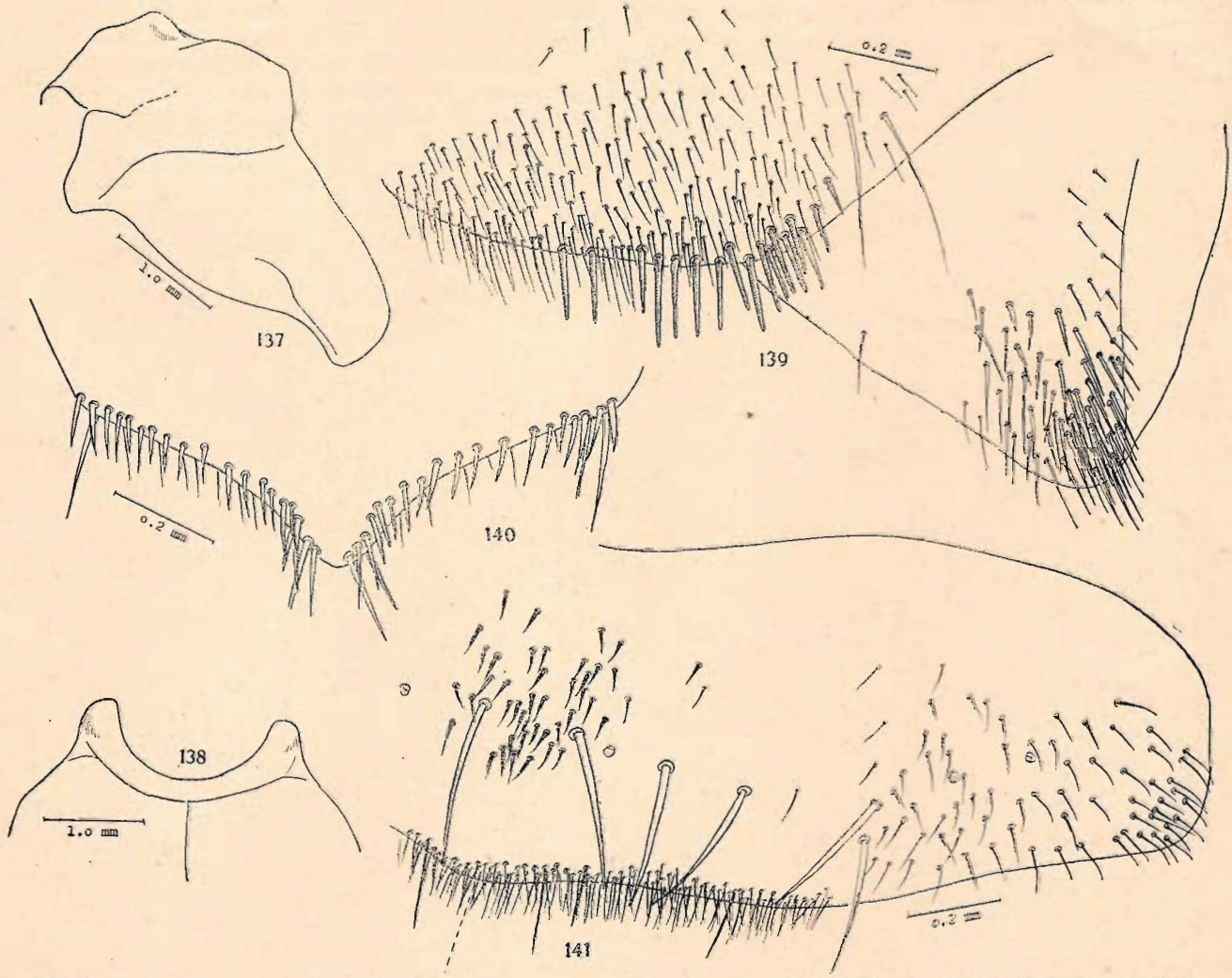
inteiramente amarelado; hipopígio de côr castanho-avermelhada uniforme. Conexivo manchado de amarelo e preto, ocupando as manchas pretas 2/3-3/4 da área total dos respectivos segmentos conexivais.

Comprimento do 1º artículo das antenas 3.5 mm; comprimentos relativos dos artículos = 1 : 0.9 : 0.8 : : 1.1. Ângulos ântero-laterais do colarinho bem salientes, em forma de processo curto, subagudo, dirigido para a frente, dorsalmente com uma área de numerosíssimos pêlos finos e curtos. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem tubérculos apicais distintos; sulco longitudinal mediano prolongando-se até o têrço basal do lobo posterior do pronoto. Pêlos do pronoto? (mal conservados). Escutelo bastante alongado, aguçado apicalmente, carena longitudinal mediana distinta posteriormente.

Tíbia anterior ligeiramente curva, muito delicada, inteiramente roliça em todo o seu comprimento, sem pêlos compridos em número considerável, apenas com fina pilosidade dourada. Tíbia mediana fortemente curva, roliça. Tíbia posterior quase reta, muito ligeiramente comprimida na sua região basal.

Hemélitros ultrapassando o ápice do abdômen por cêrca de 0.5 mm.

Genitália: Colorido do hipopígio como descrito acima. Saliência apical curta, processos apicais muito compridos, aproximados na base, ligeiramente divergentes, apicalmente arredondados, com um pequeno gancho subapical. Clásper em forma de foice (fig. 133), na face interna com pêlos bastante numerosos e longos, a parte apical muito delicada. Aedeagus (figs. 134-136) relativamente curto; envólucro atingindo o ápice do processo dorsal (D); processos laterais basais (B) bem desenvolvidos, distintamente mais fortemente esclerosados; placa ventral (V) subtrapezoidal, distinta, mas não destacada; processo terminal lateral superior (S) largo, hialino; processo terminal lateral inferior ausente; processo terminal inferior mediano bilobado, os lobos fortemente esclerosados (M).



Heniartes cachabi n. sp., ♀ — Fig. 137. Pronoto, aspecto lateral. — Fig. 138. Colarinho do pronoto, aspecto dorsal. — Fig. 139. Lobo do 8º esternito, com gonapófise anterior. — Fig. 140. Conjunto das gonapófises posteriores. — Fig. 141. Metade lateral do conjunto do 9º e 10º tergito. — Wygodzinsky del.

Distribuição: Rio Tarma, Peru, 1/2-6-1930, Cornell University Expedition col. (1 ♂, holótipo, Cornell).

Heniartes cachabi n. sp.

(figs. 137-147, 207)

Comprimento total 16.0 mm na ♀, 14.5 mm no ♂; largura máxima do pronoto 4.5 mm na ♀, 4 mm

no ♂; largura do abdômen 3.5 mm na ♀, e também 3.5 mm no ♂. Forma geral conforme fig. 207.

Colorido: Todos os artículos da antena de colorido uniformemente preto. Metade basal do 2º artículo do rostro totalmente amarelo-esbranquiçada, o resto do rostro de côr preta. Pronoto uniformemente de colorido vermelho-alaranjado claro, exceção feita de uma fina linha escura, que acompanha o bordo posterior do pronoto, atingindo os ângulos umerais. Pleura, esternos, coxas e trocanteres da côr do pronoto, exceção feita da parte superior da metapleura, que é quase preta. Escutelo preto, o seu ápice avermelhado. Clavo castanho escuro, cório vermelho-alaranjado não muito claro, ficando píceo escuro na base e na sua face interna, acompanhando o clavo; áreas claras e escuras nìtidamente separadas. Pernas de côr preta ou pícea escura, com anéis de côr alaranjada. Fêmures com estreito anel claro submediano, aproximado do ápice do artículo, quase imperceptível nos fêmures anteriores e medianos, bem distintos apenas no fêmur posterior. Anel claro da tíbia anterior e mediana em posição submediana, correspondendo o seu comprimento à sua distância da base do artículo; anel claro da tíbia posterior ligeiramente mais curto do que 1/3 do comprimento total do artículo. Face ventral do abdômen de colorido vermelho-alaranjado claro uniforme; segmentos genitais da ♀ do mesmo colorido; hipopígio do macho alaranjado, com uma faixa escura mediana longitudinal, que começa na saliência apical, e ultrapassa o meio do hipopígio. Conexivo manchado de amarelo e preto, ocupando as manchas pretas cêrca de 1/2 da área total do respectivo segmento do conexivo.

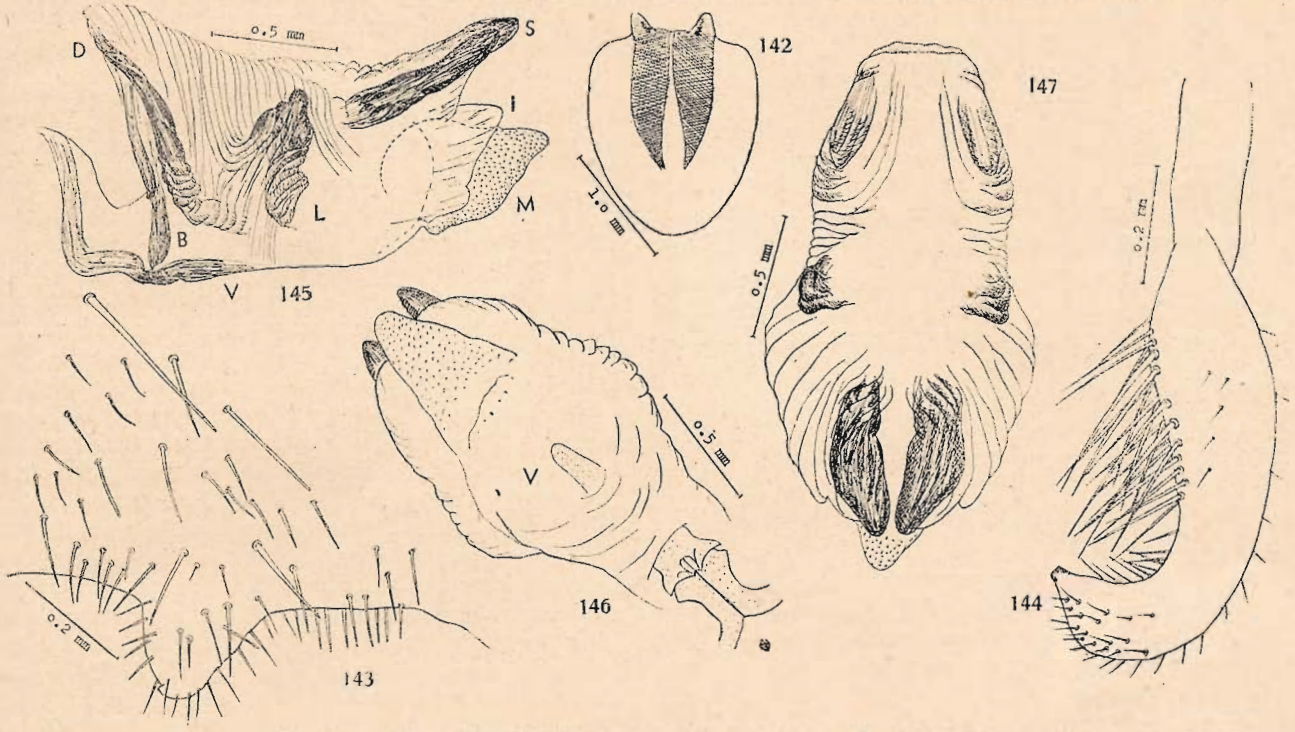
Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.5 mm; comprimentos relativos dos artículos = 1 : 0.8 : 0.9 : ?

Ângulos ântero-laterais do colarinho muito pouco salientes, arredondados. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem tubérculos apicais. Sulco longitudinal mediano prolongando-se para o têrço basal do lobo posterior. Pêlos do pronoto amarelados, pouco aparentes, pouco numerosos. Escutelo de forma regular, subagudo, crista mediana longitudinal bem distinta posteriormente. Tíbia anterior pouco curva, muito delicada, roliça em todo o seu comprimento. Tíbia mediana bastante curva, roliça. Tíbia posterior quase reta, muito ligeiramente alargada na sua parte basal, roliça no resto do seu comprimento. Hemélitros bastante largos, ultrapassando o ápice do abdômen por cêrca de 1.5 mm na ♀, e 1.5-2.0 mm no ♂.

Genitália da fêmea parecida com a de *zikáni*.

Cerdas espiniformes do bordo posterior dos lobos do 8º esternito pouco numerosas; disco com macroquetas muito pouco numerosas, e com pêlos regulares em quantidade muito grande. Cerdas espiniformes das gonapófises anteriores ocupando uma grande área (fig. 139). Cerdas espiniformes das gonapófises posteriores conforme fig. 140, bastante alongadas e numerosas. Conjunto do 9º e 10º tergito muito largo e bastante curto (fig. 141); macroquetas pouco numerosas; área central do esclerito com um grupo de cerdas fortes e curtas, fortemente esclerosadas, além das macroquetas.

Genitália do macho: Colorido do hipopígio como acima descrito. Saliência apical muito pouco pronunciada; processos apicais muito curtos, extremamente afastados na sua base, subtriangulares, com um pequeno gancho apical. Clásper curto e grosso, de forma de foice, a parte apical quase da largura da parte mediana, cerdas da face ventral bastante fortes e numerosas, o seu comprimento ultrapassando o



Heniartes cachabi n. sp., ♂ — Fig. 142. Hipopígio, aspecto ventral. — Fig. 143. Processo distal do hipopígio. — Fig. 144. Clásper. — Fig. 145. Aedeagus, aspecto lateral. — Fig. 146. Aedeagus, aspecto ventral. — Figura 147. Aedeagus, aspecto dorsal. — Wygodzinsky del.

do diâmetro do clásper nesta região. Aedeagus (figuras 145-147) relativamente curto; envólucro atingindo o ápice do processo dorsal (D); processo lateral basal (B) muito grosso fortemente esclerosado; placa ventral (V) muito pequena, triangular, não destacada; processo lateral submediano (L) longo, simples, fortemente esclerosado; processo terminal lateral superior alongado, fortemente esclerosado (S); processo terminal lateral inferior (I) curto, hialino; processo terminal inferior mediano (M) simples.

Distribuição: Cachabi, Ecuador, Rosenberg col. (1 ♂, holótipo, 1 ♀, parátipo, U. S. N. M.); Paramba, Ecuador, W. F. H. Rosenberg col. (1 ♀, alótipo, U. S. N. M.; 1 ♀ parátipo, col. autor).

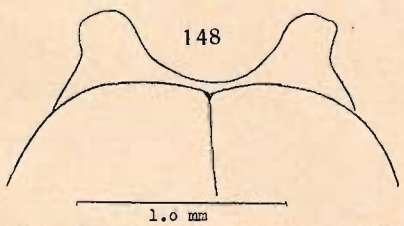
A espécie difere das afins pelos caracteres indicados na chave.

Heniartes chanchamayo n. sp.

(figs. 148, 206)

Comprimento total 15 mm; largura do pronoto 3.7, do abdômen ? mm. Forma geral do corpo estreita, conforme fig. 206.

Colorido: 1º e 2º artículo das antenas de côr uniformemente escura, os restantes ? Têrço basal do 2º artículo do rostro avermelhado, o resto preto. Co-



Heniartes chanchamayo n. sp. — Fig. 148. Colarinho do pronoto, aspecto dorsal. — Wygodzinsky del.

larinho preto; lobo anterior do pronoto de colorido vermelho-alaranjado, lobo posterior de côr amarelo-esbranquiçada, a sua margem posterior acompanhada de uma faixa de côr muito escura, quase preta, que atinge os ângulos umerais. Escutelo preto, apenas o extremo ápice avermelhado. Clavo semi-hialino; cório uniformemente de colorido amarelo-alaranjado claro. Pernas pretas; com anéis alaranjados. Trocanteres escuros: fêmures de todos os pares com 1 anel claro submediano, o dos pares anteriores muito estreito, o do par posterior do dobro do comprimento do daqueles. Tíbias com 1 anel claro submediano, o do par mediano do comprimento do do par anterior; o comprimento do anel do par posterior correspondendo a 1/3 do comprimento total da tíbia. Colorido do abdômen ?

Cabeça como em *jaakkoi*. Comprimento do 1º artículo das antenas 3.0, do 2º 2.8 mm. Ângulos ântero-laterais do colarinho pouco salientes. Lobo anterior do pronoto com os lóbulos bastante salientes, porém apicalmente sem tubérculo distinto. Pêlos do pronoto pouco numerosos, não formando fileiras distintas. Escutelo bastante comprido, triangular, aguçado, com a crista mediana longitudinal distinta. Pernas muito delicadas. Tíbia anterior pouco curva, roliça em todo o seu comprimento; tíbia mediana fortemente curva; tíbia posterior pouco curva, muito ligeiramente alargada e comprimida na sua parte basal.

Abdômen ?

Distribuição: Chanchamayo, E. Peru, W.F.H. Rosenberg col. Holótipo, 1 ex., U. S. N. M.).

Esta espécie se aproxima muito de *H. distinguendus* n. sp., diferindo da mesma pelo tamanho maior e pelos caracteres do pronoto, indicados na chave.

Heniartes maestralis Fracker & Bruner, 1924

(figs. 149-160, 208)

Comprimento total 15.5 mm na ♀, 14.0 mm no ♂; largura máxima do pronoto 4.0 na ♀, 3.5 mm no ♂; largura máxima do abdômen 3.5 mm, em ambos os sexos. Forma geral conforme fig. 208.

Colorido: Antenas pretas, base do 3º e do 4º artículo com estreito anel de colorido amarelo esbranquiçado. Rostro uniformemente preto. Colarinho e pronoto uniformemente pretos, brilhantes, com exceção de 1+1 manchas avermelhadas claras, situadas na parte anterior do lobo posterior do pronoto. Pleura esternos, coxas e trocanteres inteiramente pretos, brilhantes. Escutelo preto, brilhante. Parte posterior do clavo semi-hialino, parte anterior do clavo e o cório de colorido avermelhado claro, com exceção de uma larga faixa transversal submediana, de colorido preto. Fêmures inteiramente pretos. Tíbias pretas, com 1 anel submediano alaranjado; o comprimento do anel claro da tíbia anterior e mediana maior do que a sua distância da base do artículo; o comprimento do anel claro da tíbia posterior correspondendo a mais do que 1/3 do comprimento total do artículo. Face ventral do abdômen preta, brilhante, exceção feita de duas manchas grandes, de colorido avermelhado brilhante, e que ocupam a região ventral do 3º e 4º e do 7º e 8º esternito na fêmea, e o 3º e 4º e o 7º no macho; genitália preta em ambos os sexos; o hipopígio do macho com uma mancha vermelha em forma de T. Conexivo manchado de amarelo e preto, ocupando as manchas pretas cêrca da metade da área total dos respectivos segmentos conexivais.

Cabeça conforme figs. 149 e 150; bastante larga em frente; o comprimento do espaço postocular, na vista dorsal, menor do que o dobro do comprimento de um olho, neste aspecto; a porção postocular fortemente curva, na vista lateral. Comprimento do 1º artículo das antenas 3.0 mm; comprimentos relativos dos artículos = 1 : 0.7 : 1.0 : 1.

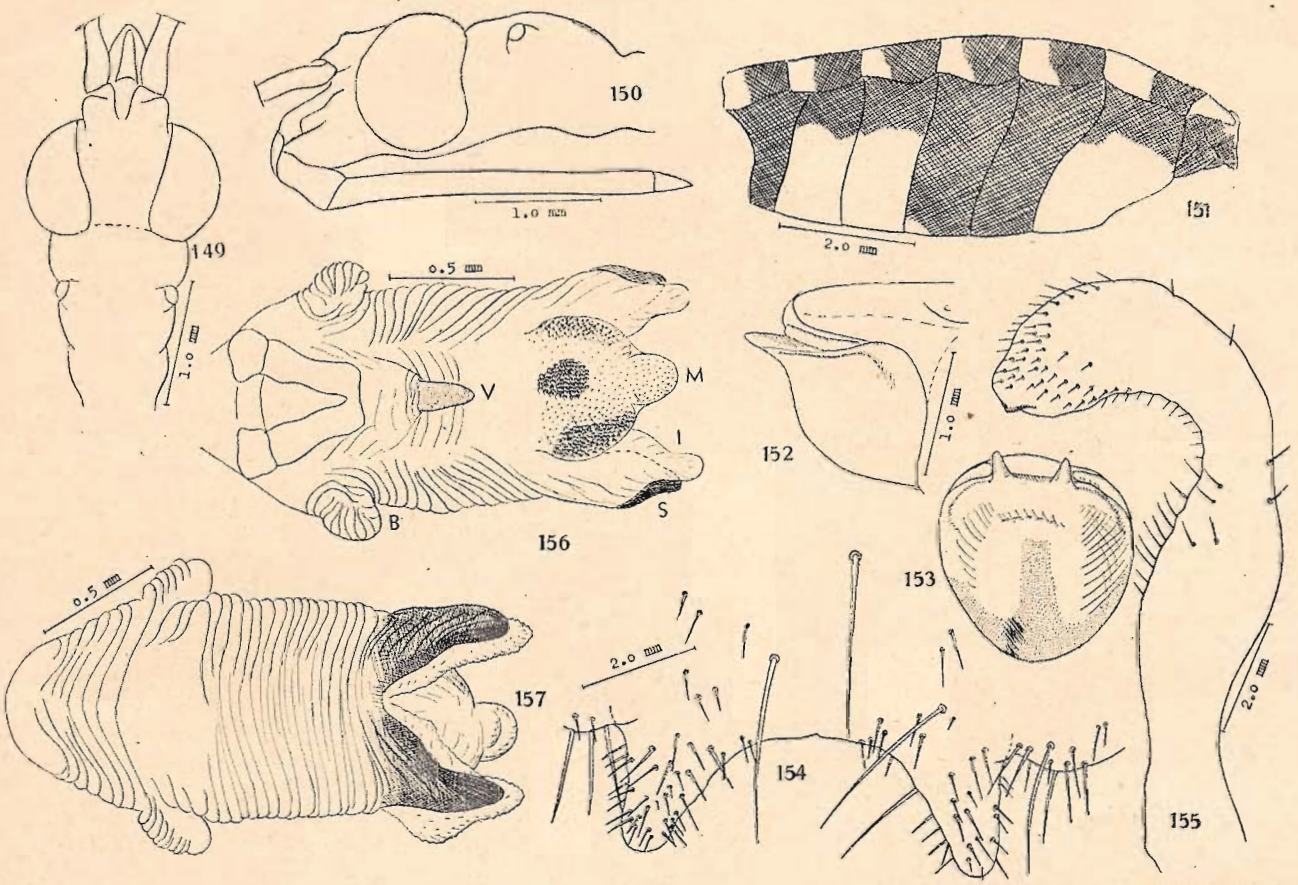
Ângulos ântero-laterais do colarinho bastante salientes, grossos, arredondados. Lobo anterior do pronoto com os lóbulos bastante salientes, cada um com um distinto tubérculo apical. Sulco longitudinal mediano bastante profundo no lobo anterior, prolongando-se até o meio do lobo posterior, cujo disco é

distintamente escavado na sua região anterior central. Pêlos do pronoto curtos, pouco numerosos. Escutelo de forma regular, subagudo, a crista longitudinal mediana bastante elevada posteriormente.

Tíbia anterior ligeiramente curva, muito delicada, inteiramente roliça em todo o seu comprimento. Tíbia mediana fortemente curva, roliça. Tíbia posterior quase reta, ligeiramente alargada na sua parte basal. Hemélitros bastante compridos, ultrapassando o ápice do abdômen por 2 mm na ♀, e 1 mm no ♂.

Genitália da ♀: Escleritos fortemente esclerosados. Lobos do 8º esternito conforme fig. 158; cerdas espiniformes marginais fortemente esclerosadas, fortes e bastante numerosas; disco com algumas macroquetas fortes e compridas, alguns pêlos regulares e numerosas cerdas espiniformes muito curtas. Gonapófise anterior (fig. 158) com as cerdas apicais ocupando uma grande área; disco com numerosos pêlos; ângulo basal interno sem pêlos ou cerdas. Conjunto das gonapófises posteriores (fig. 159) de forma subtriangular, as cerdas arrumadas em 2+2 grupos, ligados por cerdas isoladas. Conjunto do 9º e 10º tergito largo e bastante curto, com as macroquetas muito numerosas, e a área central com numerosos pêlos curtos e finos, sem arrumação definida.

Genitália do ♂: Colorido do hipopígio conforme descrito acima: a sua forma conforme figs. 153 e 154; caracterizado por um distinto rebordo lateral, que atinge a base dos processos apicais. Saliência apical quase inexistente; processos apicais bastante curtos, extremamente afastados na sua base, ligeiramente divergentes, subtriangulares, arredondados apicalmente. Clásper conforme fig. 155, fortemente curvo na sua parte distal, os pêlos da face ventral muito pouco numerosos, muito curtos e finos. Aedeagus relativamente curto e grosso (figs. 156, 157): envólucro atingindo o ápice do processo dorsal; processos laterais basais (B) distintos, membranosos; placa ventral (V) distinta, pequena, de forma triangular; processo terminal lateral superior (S) alongado, fortemente esclerosado; processos terminais laterais inferiores (I) relativamente alongados, membranosos; processo terminal inferior mediano (M) membranoso, porém com 1+1+1 áreas mais fortemente esclerosadas.



Heniartes maestralis Fracker & Bruner, 1924 — Fig. 149. Cabeça, aspecto dorsal. — Fig. 150. Cabeça, aspecto lateral. — Fig. 151. Abdômen da fêmea, aspecto lateral, com esquema da distribuição do colorido. — Fig. 152. Ápice do abdômen do macho, aspecto lateral. — Fig. 153. Hipopígio, aspecto ventral. — Fig. 154. Processo distal do hipopígio. — Fig. 155. Clásper. — Fig. 156. Aedeagus, aspecto ventral. — Fig. 157. Aedeagus, aspecto dorsal. Wygodzinsky del.

Distribuição: Rio Yao, Sierra Maestra, Cuba, 25-10-1941, J. Acuña col. (1 ♂, 1 ♀, col. autor).

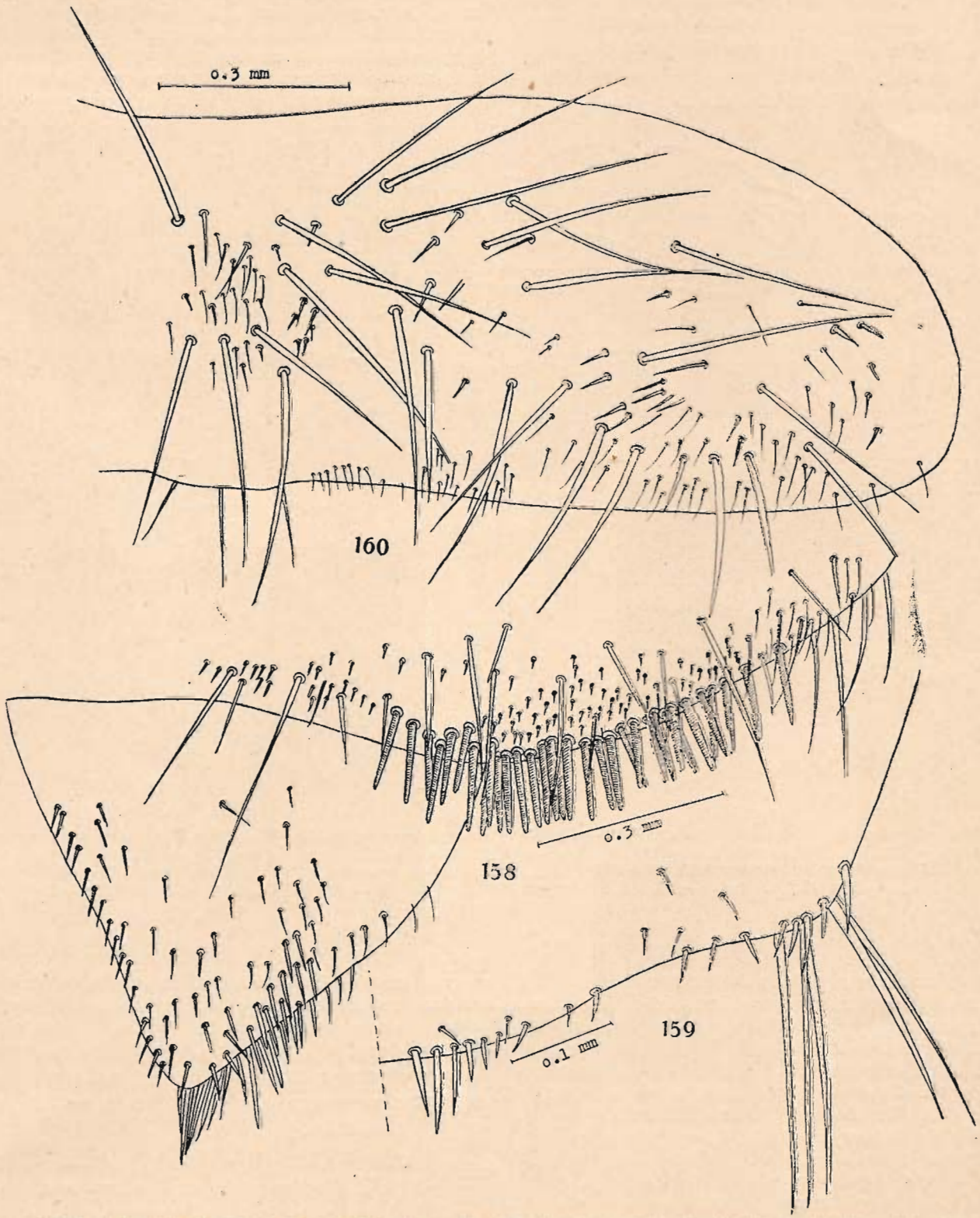
H. maestralis é muito bem caracterizado pelo colorido das antenas, do pronoto, dos hemélitros e da face ventral do abdômen.

Heniartes zikáni n. sp.

(figs. 161-170, 210)

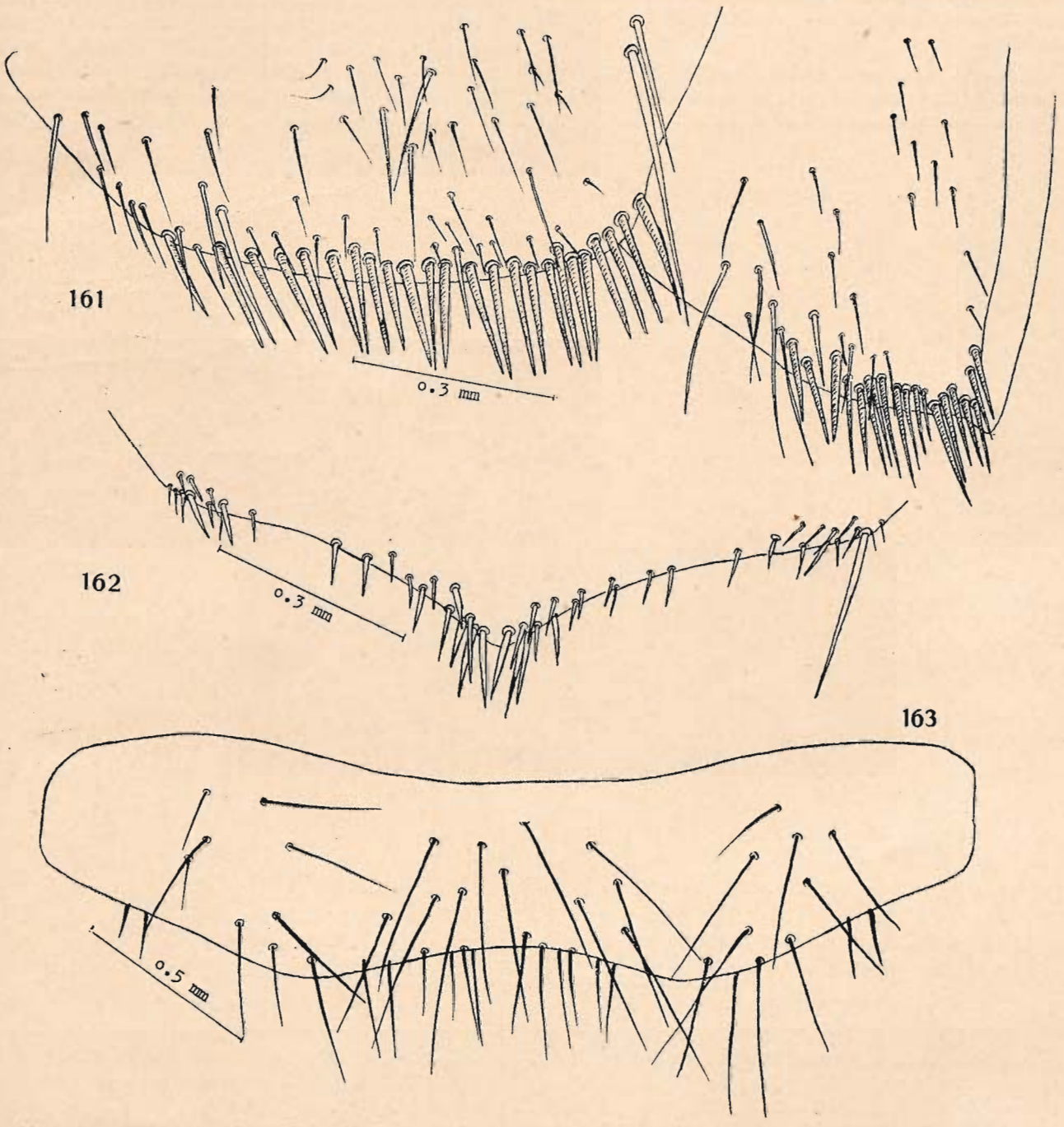
Comprimento total 15-16 mm na ♀, 14.5 mm no ♂; largura máxima do pronoto 4.1 mm na ♀, e 3.8 mm no ♂; largura máxima do abdômen 4.0 mm na ♀, e 3.0 mm no ♂. Forma geral do corpo conforme fig. 210.

Colorido: Antenas pretas, base do 3º artículo com estreito anel amarelado ou esbranquiçado, menor do que 1/5 do comprimento total do artículo. Rostro píceo escuro, o 1º artículo com 1+1 manchas



Heniartes maestralis Fracker & Bruner, 1924, ♀ — Fig. 158. Bordo posterior do lobo do 8º esternito, com gonapófise anterior. — Fig. 159. Gonapófise posterior. — Fig. 160. Metade lateral do conjunto do 9º e 10º tergito. — Wygodzinsky del.

laterais e todo o têrço basal do 2º artículo de côr amarelada ou avermelhada clara. Colarinho e lobo anterior do pronoto de colorido vermelho-alaranjado brilhante, apenas interrompido por faixas ou áreas de curtos pêlos pretos; lobo posterior do pronoto de côr amarelo-alaranjada clara. Propleura, prosterno e coxas da côr do lobo anterior do pronoto; meso e metapleura, meso e metasterno da côr do lobo posterior do pronoto; meso e metapleura parcialmente enfuscadas. Parte anterior elevada do escutelo preta, parte posterior amarela clara. Fêmures de côr castanha clara, com 5 anéis amarelados claros, resultando 5 anéis escuros, dos quais 1 apical e 4 submedianos, arrumados em dois grupos de dois anéis. Parte basal das tíbias com 4 anéis castanhos e 4 amarelos claros, sendo os claros mais compridos que os escuros; parte restante das tíbias preta (nas anteriores ou posteriores), ou pícea (nas medianas), ocupando esta região escura cêrca da metade da tíbia anterior, e cêrca de 1/3 da mediana e da posterior. Cório dos hemélitros de colorido castanho-avermelhado claro, sendo o seu ápice, especialmente as nervuras, de côr amarela clara. Face ventral do abdômen com os segmentos II-VI de côr pícea muito es-



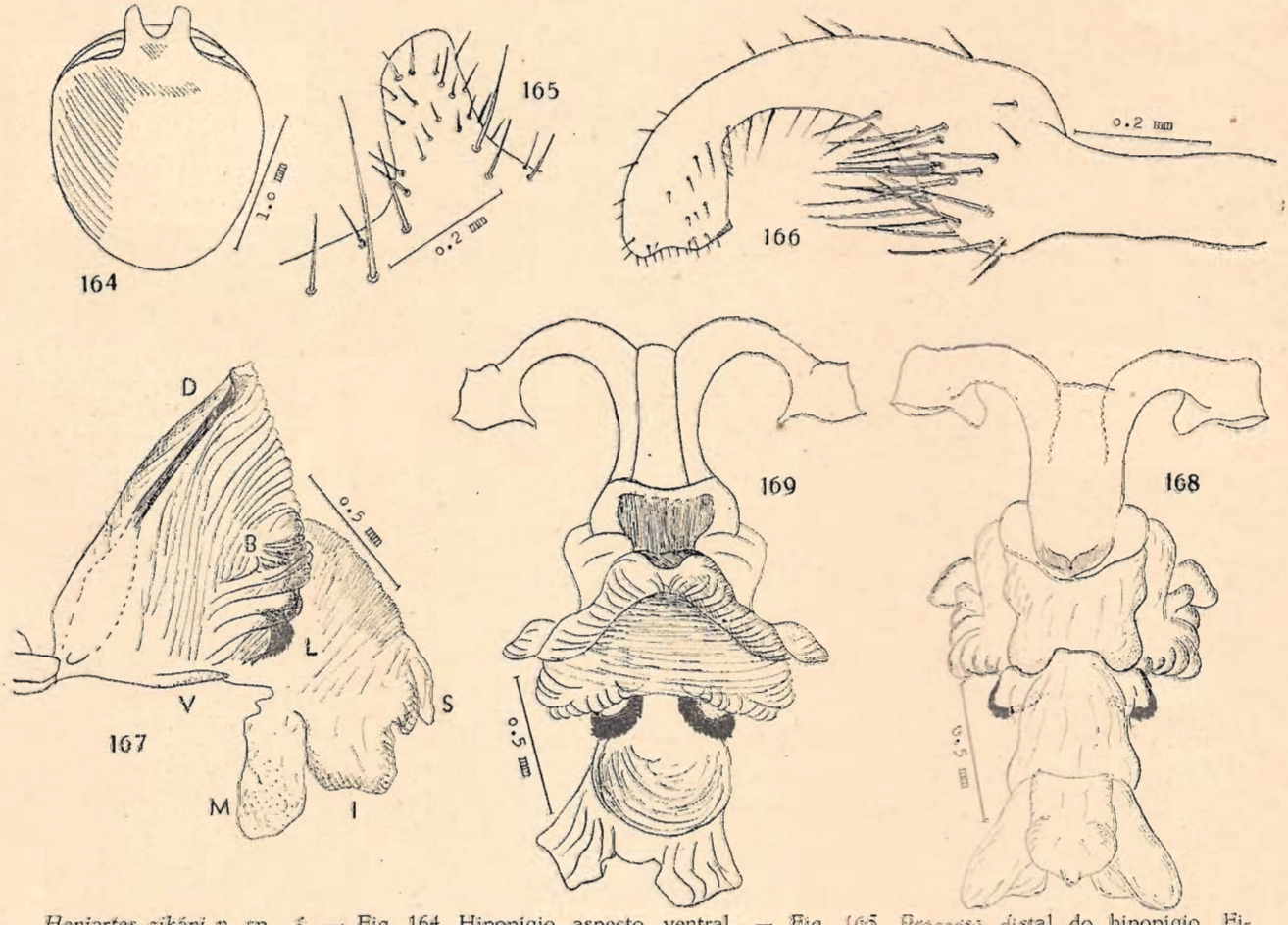
Heniartes zikáni n. sp., ♀ — Fig. 161. Lobo do 8º esternito, com gonapófise anterior. — Fig. 162. Conjunto das gonapófises posteriores. — Fig. 163. Conjunto do 9º e 10º tergito, com macroquetas (as microquetas e os pêlos não representados). — Wygodzinsky del.

cura, existindo uma larga mancha mediana de colorido vermelho brilhante, que ocupa a região central dos segmentos III-VI; 7º esternito do ♂ e o hipopígio de côr amarelada; 7º esternito e região genital da ♀ de côr castanha suja. Conexivo manchado de claro e escuro, ocupando as manchas escuras cêrca da metade da área total dos respectivos segmentos conexivais.

Cabeça como em *maestralis*. Comprimento do 1º artículo das antenas 3.0 mm; comprimentos relativos dos artículos = 1 : 0.7 : 1.2 : 1.2-1.3. Ângulos ântero-laterais do colarinho bem salientes, prolongados em processo alongado, largo na base, estreito no ápice, dorsalmente com uma área de numerosíssimos pêlos curtos e fortes. Lobo anterior do pronoto com os lóbulos bastante elevados, porém sem saliência ou tubérculo apical. Pêlos do lobo anterior extremamente curtos e numerosos, arrumados em áreas e faixas compostas de numerosas séries dêstes pêlos, conforme fig. 170. Pêlos do lobo posterior também muito curtos, muito numerosos, mais numerosos na região central anterior. Parte posterior do escutelo alongada, distintamente elevada, a carena mediana longitudinal formando uma lâmina alta. Tíbia anterior bastante curva apicalmente, distintamente comprimida na sua parte distal. Tíbia mediana distintamente curva, muito ligeiramente comprimida. Tíbia posterior reta, muito ligeiramente comprimida na sua parte basal.

Genitália da ♀; Lobos do 8º esternito conforme fig. 161; cerdas espiniformes marginais bastante numerosas e compridas; pêlos e macroquetas do disco finos, muito pouco numerosos. Cerdas espiniformes das gonapófises anteriores (fig. 161) fortes e muito numerosas, ocupando uma grande parte do bordo livre desta gonapófise; disco com algumas cerdas bem longas. Gonapófises posteriores (fig. 162) formando um conjunto de forma subtriangular; cerdas espiniformes marginais formando um grupo central apical de cerdas de comprimento médio, e 1+1 grupos laterais menos destacados, sendo êstes grupos ligados por uma fileira irregular de cerdas mais curtas. Conjunto do 9º e 10º tergito (fig. 163) muito largo e curto, a distribuição de seus pêlos e de suas macroquetas como usual; área central sem pêlos além das macroquetas.

Genitália do ♂: Hipopígio conforme fig. 164; saliência apical curta e larga; processos distais lamelosos, de bordos subparalelos, arredondados apicalmente, não muito aproximados na sua base, e divergentes no ápice. Clásper de forma de foice, com a parte apical muito alargada, cerdas da face interna



Heniartes zikáni n. sp., ♂ — Fig. 164. Hipopígio, aspecto ventral. — Fig. 165. Processo distal do hipopígio. Figura 166. Clásper. — Fig. 167. Aedeagus, aspecto lateral. — Fig. 168. Aedeagus, aspecto ventral. — Fig. 169. Aedeagus, aspecto dorsal. — Wygodzinsky del.

bastante alongadas, formando um tufo. Aedeagus (figs. 167-169) de feitio muito característico, curto e largo; envólucro atingindo o processo dorsal (D); processos laterais basais (B) removidos para a frente, muito grandes, ligeiramente esclerosados; placa ventral muito grande, bilobada, distintamente destacada (V); processos laterais submedianos em forma de escleritos arredondados (L), fortemente denteados e esclerosados; processos terminais laterais superiores (S) e inferiores (I) não muito bem diferenciados, hialinos; processo distal inferior mediano (M) simples.

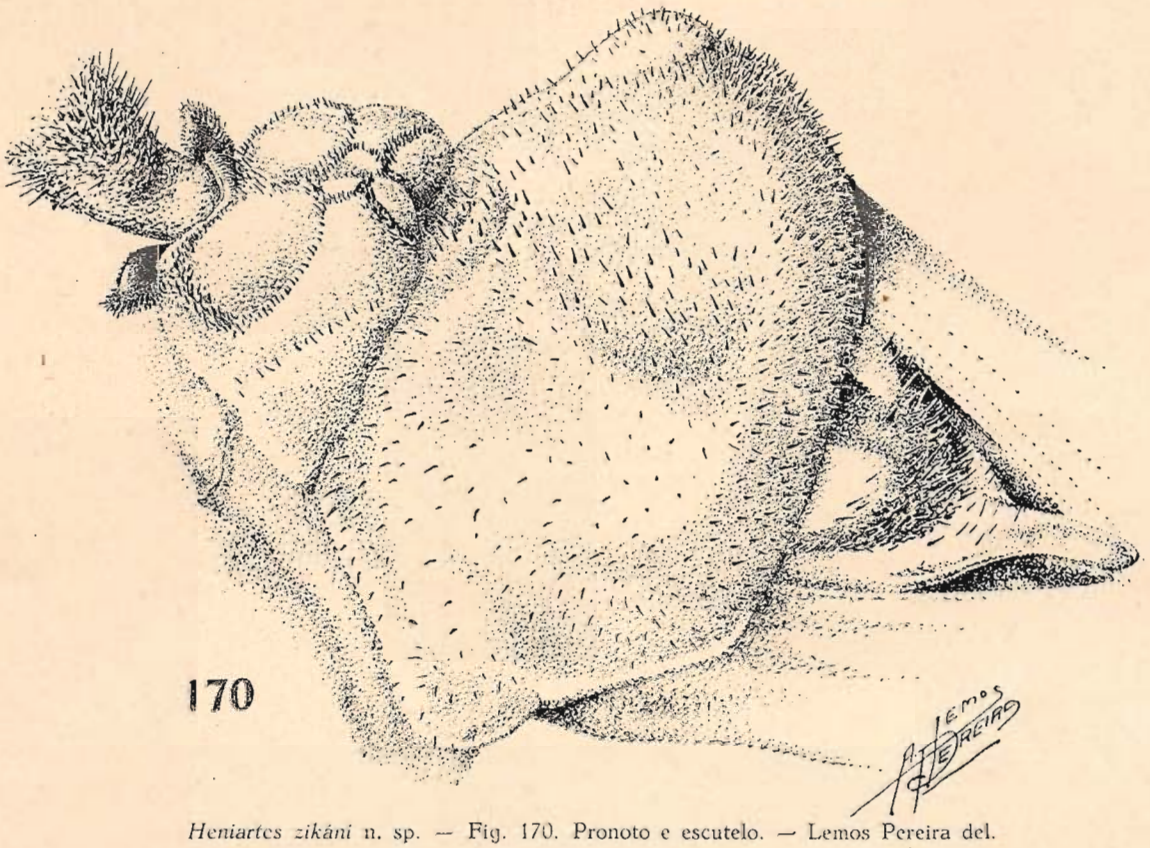
Distribuição: Itatiaia, Estado do Rio de Janeiro, Brasil, 700 m, 21-12-1924, 23-12-1928, 21-11-1935, 6-11-1943, J. F. Zikán col. (1 ♂, holótipo, 1 ♀, alótipo, I. E. E. A.; 1 ♀ parátipo, na coleção Zikán;

Heniartes carvalhoi n. sp.

(figs. 171-178, 209)

Comprimento total 13 mm; largura máxima do pronoto 3.5 mm; largura máxima do abdômen 2.5 mm. Forma geral conforme fig. 209.

Colorido: Antenas pretas, a base do 3º artículo com anel amarelado claro muito curto, menor do que 1/5 do comprimento total do artículo. Rostro preto; 1+1 manchas laterais do 1º artículo e uma longa faixa ventral e dorsal na metade basal do 2º artículo de colorido amarelado claro. Colarinho de côr pícea bastante escura; lobo anterior do pronoto de colorido vermelho-alaranjado claro; lobo posterior de côr amarela clara. A maior parte da propleura, os esternos e as coxas da côr do lobo anterior do pro-



Heniartes zikáni n. sp. — Fig. 170. Pronoto e escutelo. — Lemos Pereira del.

1 ♂, parátipo, I. O. C., Lima); São Paulo, Ypiranga, 10-10-1906, H. Luederwaldt col. (1 ♂, Dep. Zool.); Rio Matipóo, Fazenda Floresta, Estação Matipóo, Minas Gerais, Brasil, 7-1919, P. de Fonseca col. (1 ♂, Dep. Zool. São Paulo; 1 ♂, I. O. C. Lent; 1 ♂, col. autor); Fazenda Mongolinho, Corumbá, Goiaz, Brasil, 8-6-1942 (1 ♀, Dep. Zool.); Leopoldo Bulhões, Goiaz, Brasil, 10-1937, Spitz col. (1 ♀, col. autor); Goiaz, Brasil, sem localidade (1 ♂, U. S. N. M.).

A espécie, juntamente com a seguinte, *H. carvalhoi*, ocupa um lugar singular dentro do gênero. Temos prazer em dedicá-la ao nosso amigo J. F. Zikán, que tantas contribuições tem feito para o conhecimento da entomofauna brasileira.

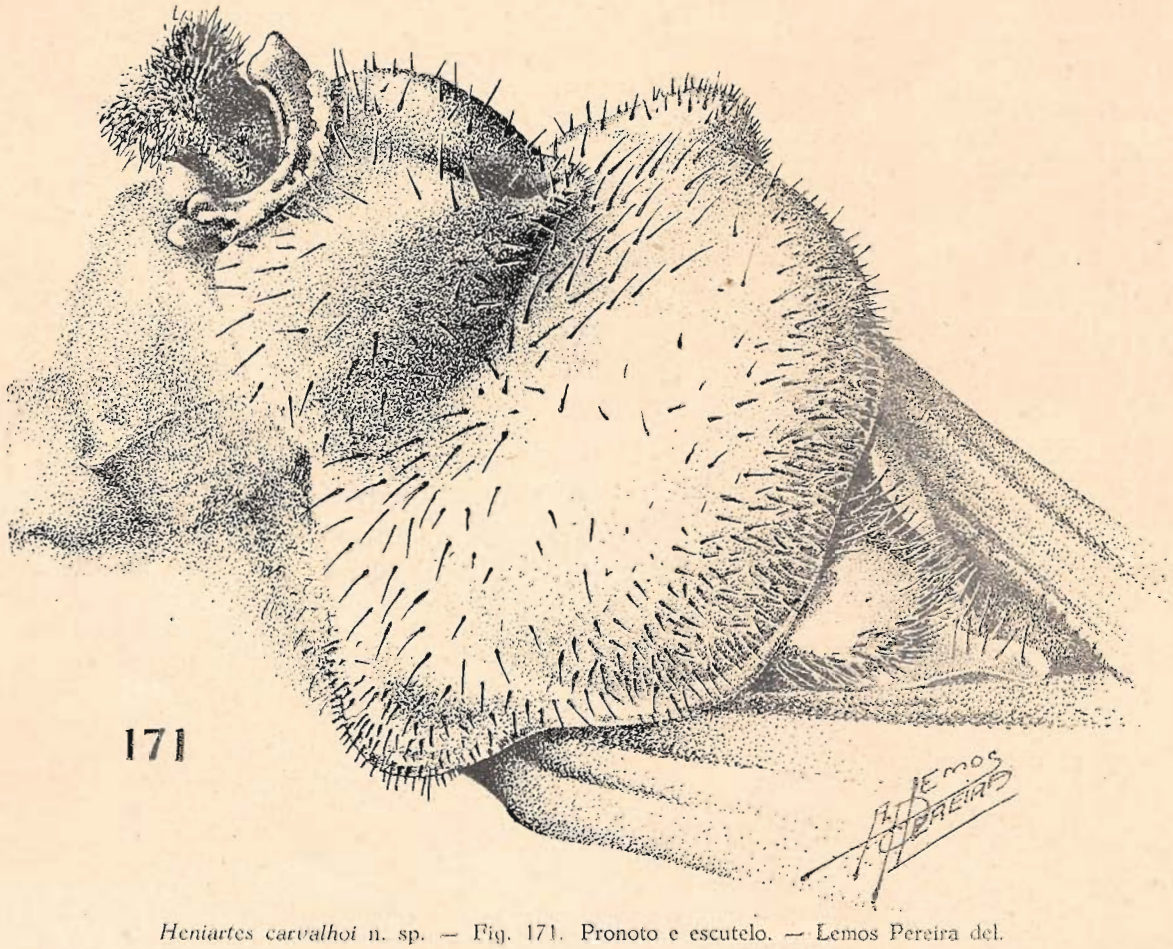
noto: acetábula da propleura, a meso e metapleura da côr do lobo posterior do pronoto. Parte elevada do escutelo de côr pícea escura; parte posterior amarela clara. Cório de côr amarelo-alaranjada mais ou menos escura, ficando a extremidade posterior de côr amarela clara. Fêmures de côr castanha, com 5 anéis amarelados claros, resultando 6 anéis escuros, dos quais 1 basal, 1 apical e 4 submedianos, sendo êstes últimos arrumados em grupos de 2. Parte basal das tíbias com 4 anéis claros e 4 escuros, sendo os escuros distintamente mais curtos; parte distal das tíbias escura, de côr preta nas tíbias anteriores e posteriores, de côr castanha nas medianas, ocupando esta região escura na tíbia anterior ligeiramente mais, nas medianas e posteriores ligeiramente menos do que a metade do comprimento total do respectivo ar-

tículo. Segmentos ventrais do abdômen avermelhados, sendo a parte posterior dos esternitos, na região lateral, de côr quase preta, com pequenas manchas circulares de côr clara. Segmentos genitais em ambos os sexos de côr amarelada uniforme. Conexivo manchado de amarelo e preto, ocupando as manchas escuras ligeiramente mais do que a metade da área total dos respectivos segmentos.

Cabeça como em *flavicans*. Comprimento do 1º artículo das antenas 2.2 mm; comprimentos relativos dos artículos = 1 : 1.1 : 1.1 : 1.4. Ângulos ântero-laterais do colarinho salientes, subagudos, com cerdas isoladas. Lobo anterior do pronoto com os lóbulos muito elevados, em forma de saliências cônicas muito altas e fortes, afastadas na sua base, ligeiramente aproximadas no seu ápice. Cerdas do lobo anterior e posterior do pronoto fortes e compridas, não muito numerosas, o maior número sôbre as saliências do lobo anterior do pronoto, nas regiões laterais dêste lobo arrumadas em fileiras não muito distintas. Escutelo bastante alongado posteriormente (porém menos do que em *zikáni*), aguçado, a crista mediana longitudinal posteriormente em forma de lâmina elevada. Tíbia anterior ligeiramente curva, distintamente comprimida em todo o seu comprimento. Tíbia mediana fortemente curva, ligeiramente comprimida. Tíbia posterior quase reta, distintamente comprimida na sua parte basal. Hemélitros bastante estreitos, ultrapassando o abdômen por ligeiramente mais do que 1 mm.

Genitália da ♀ como em *zikáni*.

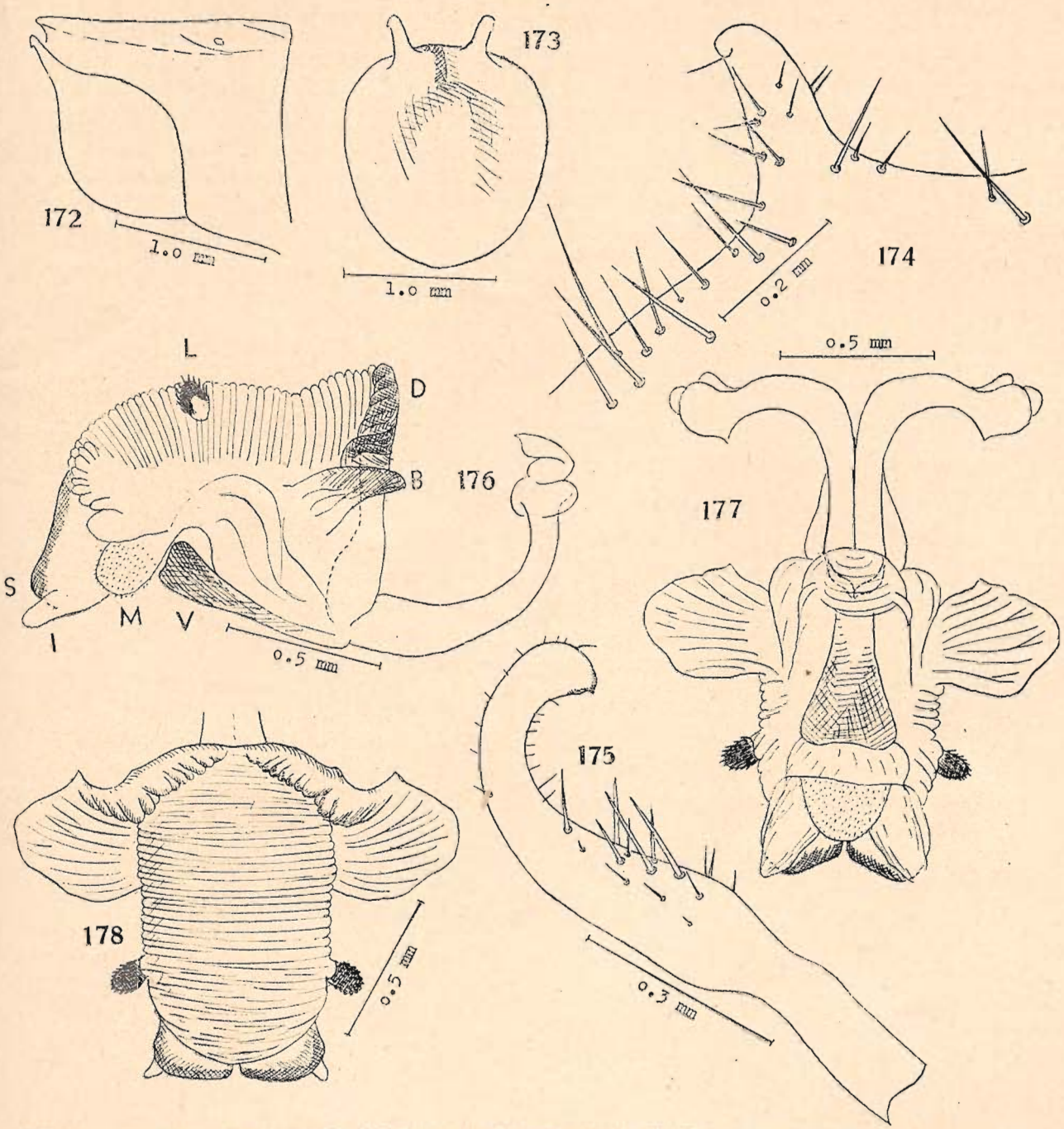
Genitália do ♂ : Hipopígio conforme figs. 172 e 173. Saliência distal não perceptível. Processos apicais delicados, com um pequeno gancho apical, muito afastados na sua base, correspondendo a sua distância entre si ao seu próprio comprimento; ligeiramente divergentes apicalmente. Clásper delicado, pequeno, a sua forma conforme fig. 175; a sua face ventral com cerdas muito pouco numerosas, de comprimento médio, e bastante fortes. Aedeagus (figuras 176-178) parecido com o de *zikáni*, porém distinguido pelos processos laterais submedianos menores e mais salientes, e pela conformação ligeiramente diferente da sua parte distal, conforme figuras.



Heniartes carvalhoi n. sp. — Fig. 171. Pronoto e escutelo. — Lemos Pereira del.

Distribuição: Carmo do Rio Claro, Sul de Minas, Minas Gerais, Brasil, 12-1944, J. C. M. Carvalho col. (1 ♂ holótipo, I. E. E. A.; 1 ♀, alótipo, col. autor); Paraopeba, Minas Gerais, Brasil, 1-1-1931, V. R. Souza col. (1 ♀, Mus. Nac.); Lassance, Minas Gerais, Brasil, 9/19-11-1919 (1 ♂, Cornell).

A nova espécie aproxima-se bastante de *H. zikáni;* as duas espécies são fàcilmente separadas pelo feitio do pronoto, e pela genitália do macho. A espécie é dedicada ao nosso amigo José Cândido de Melo Carvalho.



Heniartes carvalhoi n. sp., ♂ — Fig. 172. Ápice do abdômen, aspecto lateral. — Fig. 173. Hipopígio, aspecto ventral. — Fig. 174. Processo distal do hipopígio. — Fig. 175. Clásper. — Fig. 176. Aedeagus, aspecto lateral. — Fig. 177. Aedeagus, aspecto ventral. Fig. 178. Aedeagus, aspecto dorsal. — Wygodzinsky del.

DISTRIBUIÇÃO GEOGRÁFICA

A discussão da distribuição geográfica das espécies do gênero *Heniartes* é ainda grandemente dificultada pela escassez do material examinado. Não conseguimos material de grande parte da região neotrópica, onde o gênero é seguramente representado. Limitamo-nos, por isso, a apresentar os fatos apurados da distribuição, sem querer tirar conclusões gerais.

Em zoogeografia, o estudo da distribuição das espécies em si, geralmente, apresenta pouco interêsse, de um ponto de vista mais geral. Costumam-se demonstrar as áreas de distribuição de entidades sistemáticas mais elevadas, como famílias, tríbus ou gêneros. Em nosso caso, vamos considerar os bem definidos "grupos específicos" (veja pg. 18), que fornecerão indícios mais seguros.

Seguimos nas presentes considerações principalmente o sistema zoogeográfico de

LANE (1943), o qual, pelo menos para certos grupos de insetos neotropicais, parece melhor corresponder às condições naturais.

No centro central-americano aparentemente não existem representantes do gênero *Heniartes*. CHAMPION (1898) que examinou um material muito grande desta região, nada menciona sôbre o gênero; considerando o fato de serem os espécimens do gênero, quando encontrados, geralmente bastante numerosos, podemos quase excluir definitivamente *Heniartes* da América Central.

A sub-região antilhana possui uma espécie isolada, *H. maestralis*, que é encontrada em maiores altitudes da Sierra de Maestra, na Ilha de Cuba. A espécie representa um grupo independente, porém bem próximo do grupo *distinguendus*, cujos representantes vivem no centro incásico.

Nas vertentes amazônicas dos Andes do Peru e do Equador, no centro incásico, encontra-se o grupo *distinguendus;* êste grupo tem uma posição taxonômica isolada, tendo relações mais estreitas apenas com *H. maestralis*, acima mencionada, da Ilha de Cuba.

O centro amazônico é muito bem caracterizado pelo grupo *flavicans*, composto de numerosas espécies, que se extendem das Guianas e do Pará até a Alta Amazônia, e certamente ocupam tôda a região da floresta amazônica. As diferentes espécies aparentemente possuem uma área bem limitada de distribuição; apenas *H. flavicans*, segundo os dados à nossa disposição, encontra-se numa área que mede pelo menos 2.000 km na direção este-oeste. Também está limitado à região amazônica o pequeno grupo *tumatumari*, com uma espécie nas Guianas, e uma outra no Alto Amazonas. Pelo aspecto externo, estas espécies se assemelham muito às do grupo *flavicans;* o exame morfológico detalhado, porém, estabelece certas relações com espécies de grupos do centro tupi-guarani. *H. demerara* é o representante de um pequeno grupo isolado, cujas relações não determinamos ainda seguramente.

A presença de uma espécie representante de um grupo independente, *H. maracaibo*, em Maracaibo, na Venezuela, que não tem relações nem com o grupo *flavicans* e afins, nem com o grupo *distinguendus*, mas que se aproxima aos já mencionados grupos do centro tupi-guarani, parece indicar um distinto centro cariba.

No centro tupi-guarani encontramos 3 grupos, *zikáni, jaakkoi* e *erythromerus;* os dois últimos são bem próximos taxonômicamente. O primeiro grupo, composto de duas espécies muito singulares, e que têm distantes relações sistemáticas com os grupos *distinguendus* e *maestralis*, parece ser localizado na região norte do centro tupi-guarani, especialmente nos Estados de Minas Gerais e Goiaz. O grupo *jaakkoi*, também de extensão territorial bem limitada, tem aparentemente o seu centro mais forte nos Estados do litoral, do Paraná até Bahia. O grupo *erythromerus* se compõe de espécies bem diferenciadas, porém bastante afins, cuja área total de distribuição é muito grande, ultrapassando os confins do próprio centro tupi-guarani, no sentido de LANE (1943). No sul, o grupo (e com êste o gênero) parece não ter ultrapassado o Rio da Prata; no oeste, o grupo, passando pelo Chaco, atinge os contrafortes dos Andes (com *H. erythromerus, birabéni* e *annulatus*); no Nordeste do Brasil existe também uma espécie do grupo, *H. nordestensis;* as regiões montanhosas do Norte de Minas Gerais são habitadas por duas espécies isoladas, *H. travassosi* e *thoracicus*. Salientamos ainda que duas espécies dêste grupo *erythromerus* e *annulatus* tem uma área de distribuição bem grande, que nas direções norte-sul e oeste-este ultrapassa 1.500, atingindo provàvelmente 2.000 km.

Resta examinar o centro Plateau Central. Pràticamente não possuimos material desta região; achamos, porém, muito provável serem aqui representados os grupos *zikáni* e principalmente *erythromerus*, êste último provàvelmente até com as espécies de grande área de distribuição acima mencionadas.

NOTAS BIOLÓGICAS

Possuimos observações biológicas apenas sôbre *Heniartes jaakkoi*, espécie bastante comum nas regiões baixas da Serra do Itatiaia, no Estado do Rio de Janeiro, Brasil. Encontramos indivíduos da espécie nos meses de verão, durante as horas mais quentes do dia, pousando sôbre fôlhas de arbustos e gramíneas, nas encostas de morros de vege-

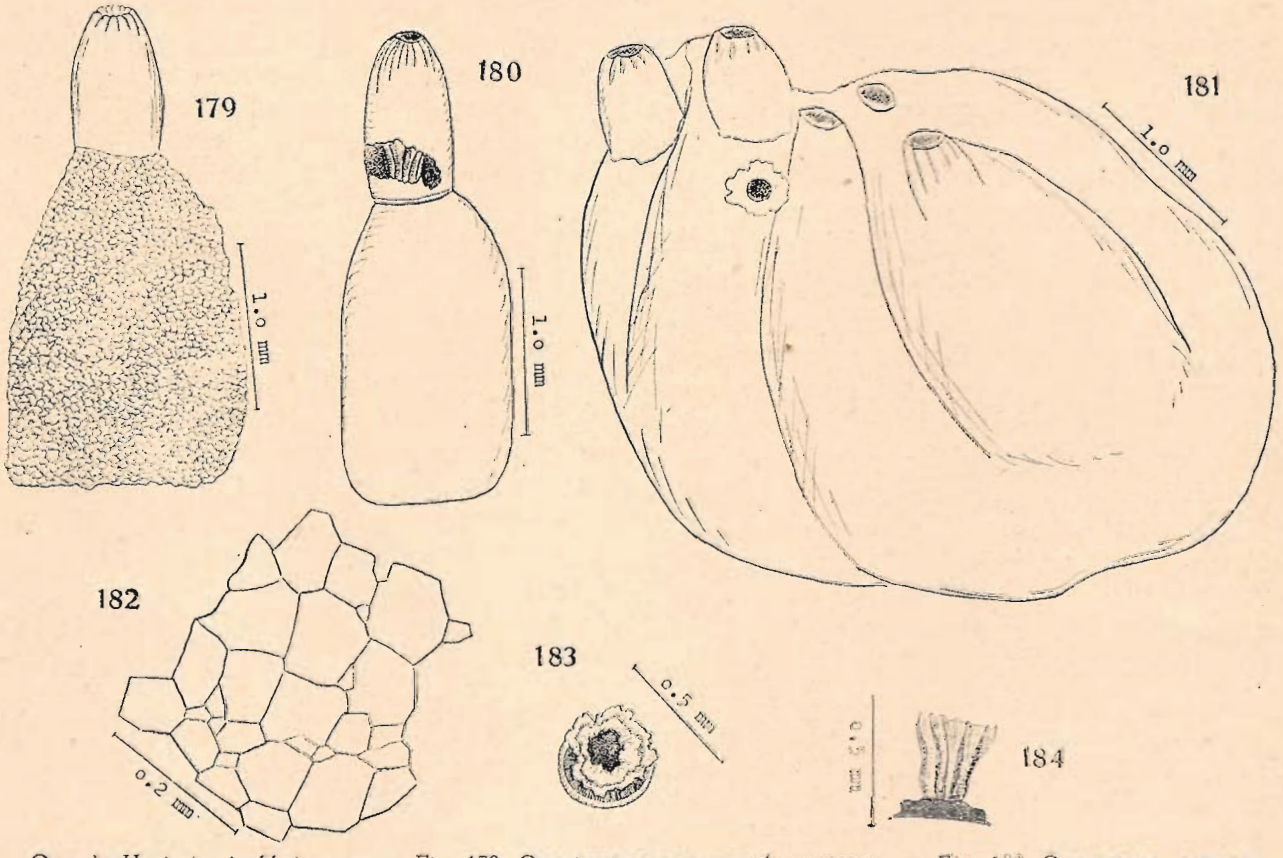
tação luxuriante, no bordo das capoeiras, ou em lugares mais claros dos caminhos que atravessam estas capoeiras; também observamos espécimens executando vôos rápidos e curtos, de um arbusto para outro próximo. Uma vez pousados, logo assumem a característica posição de espera, com as patas anteriores levantadas. Quando se lhes depara uma mosca ou qualquer outro inseto, o *Heniartes* dêle se aproxima lenta e cautelosamente, sempre com as patas anteriores para cima. Quando a vítima se encontra quase debaixo das patas anteriores levantadas, êle as abaixa ràpidamente, esforçando-se por capturar o inseto atacado com a pinça formada pelo fêmur e pela tíbia anterior, tarefa, aliás, facilitada pela grande quantidade de secreção viscosa com a qual costumam estar cobertas as pernas de muitas espécies de *Heniartes*. Uma vez capturado o inseto, nêle é introduzida a ponta do rostro do hemíptero, seguindo-se a morte ou pelo menos a completa paralização da vítima em poucos segundos.

Aparentemente, *Heniartes* é polífago, como a maioria dos *Reduvioidea* entomófagos. Na natureza observamos *Heniartes* capturando as mais variadas presas; no laboratório, a escolha da presa era apenas limitada pelo tamanho da vítima. Acidentalmente, observamos no laboratório também adultos chupando mel que lhes oferecemos, o que, aliás, acontece com vários outros reduviídeos entomófagos. — A alimentação é igual para todos os estados evolutivos; apenas os *Heniartes* recém-nascidos, segundo nossas observações no laboratório, não aceitaram no início presas animais. Quando, porém, oferecemos um pouco de mel aos pequenos hemípteros, êstes o sugaram àvidamente, passando até a cobrir as patas propositadamente com mel. Depois de ter feito esta primeira refeição, êstes *Heniartes* do 1.º estádio evolutivo começaram a caçar pequenos insetos, como os adultos ou estádios evolutivos mais adiantados.

Não observamos a cópula de *H. jaakkoi*, nem conseguimos verificar qualquer aproximação dos dois sexos, que possa ser considerada como preparação de um ato sexual. — A postura se efetua durante o verão; infelizmente não dispomos de dados mais exatos. Encontramos uma única vez uma postura na natureza (fig. 181); era composta de cêrca de 10 ovos colados na face superior de uma fôlha de arbusto, numa altura de cêrca de 2 m sôbre o chão. Também conseguimos várias vêzes posturas no laboratório, porém compostas apenas de 1-3 ovos de cada vez. Estas posturas menores se repetiram de dois em dois ou três dias, e provàvelmente indicam um tipo anormal de postura, a ser atribuído à alimentação insuficiente do animal em cativeiro. Os próprios ovos correspondem ao tipo geral dos ovos dos *Reduviidae*. São compostos do corpo principal, de forma ovóide, ligeiramente variável, segundo o substrato e outras condições exteriores, de um distinto cilindro terminal, de cêrca da metade do comprimento do corpo principal, e de uma "rôlha", que, antes do inseto ter saído, repousa sôbre o bordo superior do corpo principal do ovo, dentro do cilindro terminal; esta "rôlha", cujo feitio se explica pelas figuras 183 e 184, é empurrada pelo hemíptero que emerge do ovo, e por sua vez abre a extremidade distal do cilindro terminal. O ovo é protegido por uma massa amorfa, esponjosa, secretada como um líquido espumoso no ato da oviposição, e endurecendo pouco depois. Esta massa une os ovos contidos na mesma postura, deixando perceber apenas o cilindro terminal. Sem dúvida, esta massa amorfa, esponjosa, de volume considerável, é capaz de proteger os ovos contra certos perigos mecânicos e talvez contra ataques de parasitos; mas nada de definitivo podemos assegurar neste sentido. Mencionamos ainda que o córion do próprio ovo é liso; uma reticulação irregular aparente resulta de partes aderentes da massa espumosa protetora; a base da "rôlha" e o cilindro terminal possuem uma fina estrutura de pentágonos ou hexágonos.

Os *Heniartes jaakkoi* do 1.º estádio postembrionário (fig. 185) já deixam perceber o feitio característico do gênero, distinguindo-se do adulto apenas pelos caracteres inerentes a todos os hemípteros dos primeiros estádios postembrionários, como os tarsos biarticulados, a ausência de hemélitros, asas e ocelos, e as proporções diferentes das várias partes do corpo. A nossa figura mostra ainda a cabeça muito grande, e as aberturas das glândulas abdominais. As tíbias anteriores já são ligeiramente achatadas. Os estádios seguintes demonstram a transformação usual para o feitio definitivo do adulto, sem apresentar nada de especial; por isso não apresentamos figuras.

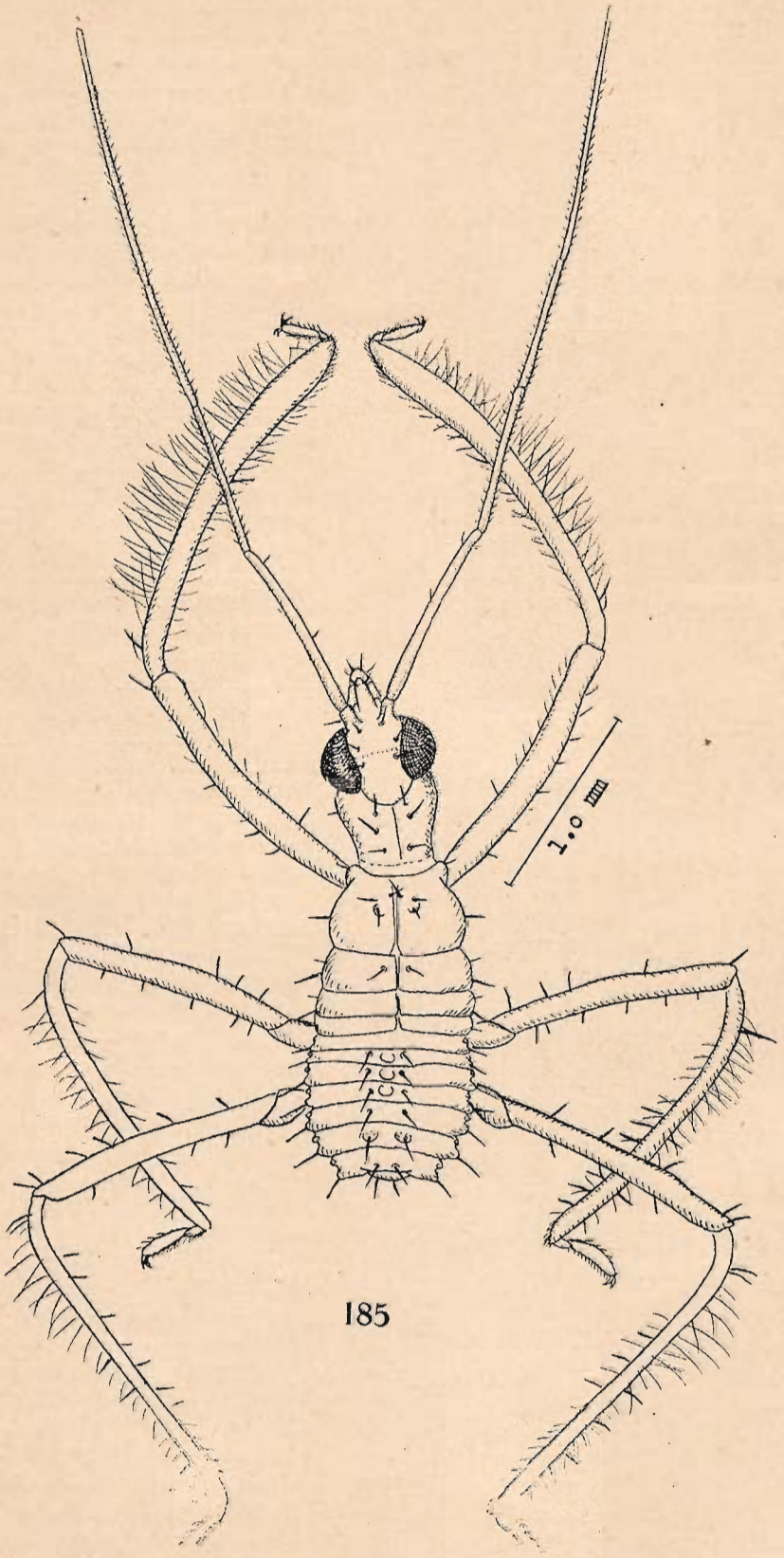
Os *Heniartes* apresentam alguns interessantes problemas biológicos e fisiológicos. Não conseguimos, por exemplo, por não termos aprofundado os respectivos estudos, explicar a produção e a significação biológica (se ela existe...) das secreções de cêra, encontradas em várias partes do corpo dos *Heniartes*. Em tôdas as regiões, onde há manchas de cêra, encontramos áreas de pelinhos muito finos e numerosos (fig. 7), cuja extensão corresponde exatamente à das manchas de cêra. Um exame rápido dêstes pêlos faz insetos vivos, tocando acidentalmente numa parte do corpo de *Heniartes*, coberta desta massa, não conseguiram mais libertar-se, ficando assim presas fáceis do hemíptero. Não temos certeza quanto ao modo de produção do líquido; as cerdas fortes, espalhadas em grande quantidade no corpo e especialmente na face ventral do abdômen e nas pernas, arredondadas no seu ápice e aparentemente canaliculadas, nos parecem indicar os caminhos de secreção do líquido, provàvelmente produzido em pequenas glândulas unicelula-



Ovo de *Heniartes jaakkoi* n. sp. — Fig. 179. Ovo inteiro, com camada protetora. — Fig. 180. Ovo inteiro, sem camada protetora; o cilindro terminal parcialmente aberto, para mostrar a «rôlha». — Fig. 181. Postura completa. — Fig. 182. Superfície do ovo, com pseudoestrutura. — Fig. 183. «Rôlha», vista de cima. — Fig. 184. «Rôlha», aspecto lateral. — Wygodzinsky del.

muito provável servirem êles apenas como meio de segurar o floco de cêra no seu lugar predeterminado. Não sabemos, onde e como é produzida esta cêra.

Um outro problema apresenta o líquido viscoso, que se encontra principalmente nas pernas de *H. jaakkoi* e de outras espécies, e que por anos depois da morte do exemplar não perde a sua viscosidade. A utilidade desta massa, cujas características se assemelham às da cola usada para capturar moscas domésticas, é óbvia: observamos várias vêzes, que res espalhadas em muitos lugares do corpo. Os *Heniartes* recém-nascidos, porém, ainda não possuem a faculdade da secreção dêste líquido. No laboratório, o mel que lhes oferecemos, para alimentação, foi àvidamente procurado, não para alimentação, mas para cobrir as patas anteriores; e só depois de inteiramente coberta desta resina substituta é que os pequenos animais começaram ativamente a caça. Temos aqui um caso análogo ao de *Amulius malayus* Stal, onde também o adulto incapaz de produzir uma resina, procura



Figs. 185. 1º estádio postembrional de *Heniartes jaakkoi*. — Wygodzinsky del.

substâncias estranhas para êste fim (Miller, 1942). Os pequenos *Heniartes*, na natureza, provàvelmente obtêm a sua resina da própria postura, que é coberta de uma substância viscosa.

Um terceiro fato interessante, que aqui podemos mencionar apenas ligeiramente, é a repetição do aspecto típico das espécies de *Heniartes* (forma e colorido) em espécies pertencendo a outros gêneros, seja da própria subfamília (gênero *Apiomerus*), seja da subfamília *Harpactorinae* (vários gêneros ainda não identificados).

SUMMARY

The author studies 28 species of *Heniartes* Spinola, 1837, 5 of which are identified with previously described ones; 23 are considered as new to science. The classification of the species of the genus is based chiefly on the following characters:

1 st Distribution of color on the various parts of the body.
2nd Relative length of articles of antennae.
3rd Distribution of bristles on anterior lobe of pronotum.
4th Chaetotaxy of genital segments of female.
5th Form of hypopygium, claspers and aedeagus of male.

The following key facilitates the determination of the species:

1. Pronotum black, with 1+1 circular spots of reddish or yellowish color on anterior part of posterior lobe (fig. 208) ..... *maestralis* Fracker & Bruner
— Pronotum differently colored 2
2. Apex of corium black, like the membrane (figs. 198-201) 3
— Apex of corium reddish or yellowish, like the remainder of corium (fig. 186) 7
3. The basal half or the basal 2/3 of femora uniformly dark colored (fig. 199) ..... *geijskesi* n. sp.
— Basal region of femora not dark colored (fig. 198) 4
4. Scutellum of regular shape, subtriangular (fig. 198) 5
— Scutellum excessively elongate apically (fig. 201) ..... 4a.
4a. Prolongation of scutellum compressed dorsoventrally, slender at base, larger subapically; relative length of the first three joints of antennae = 1 :0.5:1.0 ..... *scutellatus* n. sp.
— Prolongation of scutellum compressed laterally; relative length of the first three articles of antennae = 1 :0.65:1:1 ..... *productus* Stal
5. Posterior lobe of pronotum with its bristles in usual number (fig. 76); genitalia of male as in figs. 80-86 6
— Posterior lobe of pronotum with its bristles extremely numerous (fig. 111); genitalia of male as in figs. 112-116 ..... *demerara* n. sp.
6. Antero-lateral angles of collar with a field of numerous short bristles (fig. 76) ..... *flavicans* (F.)
— Antero-lateral angles of collar without said field ..... *putumayo* n. sp.
7. Femora uniformly dark coloured, without traces of lighter regions (figs. 192-194); third article of antennae always shorter than first one 8
— Femora with one or several brighter annuli; sometimes, as in *cachabi*, only distinct on posterior pair; relative length of third article of antennae varied 10
8. Dark and bright regions of corium distinctly separated; pronotum uniformly red ..... *nordestensis* n. sp.
— Dark and bright regions of corium confluent; posterior lobe of pronotum distinctly darker than anterior lobe 9
9. Big species (female 19 mm); posterior lobe of pronotum, as well as femora, black; tibia of second pair almost straight (fig. 193) ..... *thoracicus* n. sp.
— Small species (female 15 mm); posterior lobe of pronotum, as well as femora, dark red; tibia of second pair strongly curved (fig. 194). ..... *travassosi* n. sp.
10. Base of femora red, the remaining 4/5 black (fig. 191) ..... *birabéni* n. sp.
— Femora differently coloured 11
11. Femora black or piceous, with or without bright basal annulus, and with only one light submedian or subapical annulus (fig. 186) 12
— Femora black, piceous or reddish, always with more than one clear annulus, not counting the basal one (figs. 188, 196, 209) 20
12. Anterior tibia distinctly compressed, many times covered by a viscous mass 13
— Anterior tibia not compressed, not covered by a viscous mass 17
13. Posterior lobe of pronotum red anteriorly, and with a large black band on its posterior region, dark and bright regions distinctly separated; corium black, with a distinct posterior yellow spot (fig. 195) ..... *maracaibo* n. sp.
— Posterior lobe of pronotum uniformly reddish or yellowish, sometimes secondarily infuscated, in this case the dark and bright regions not distinctly separated; corium more or less uniformly reddish, dark and bright regions confluent 14
14. Species with elongate body and lanceolate hemelytra, as in *flavicans* (fig. 203), the hemelytra much longer than abdomen (more than 1 mm); species from the Amazon region ..... *beebei* n. sp. (see nº 25)
— Species with shorter body (fig. 186), the hemelytra less elongate, not much longer than abdomen (less than 1 mm); species from southern Brazil 15
15. Base of posterior tibiae without dark annulus; rostrum entirely black ..... *lopesi* n. sp.
— Base of posterior tibiae with black annulus; base of second segment of rostrum partly bright coloured 16

16. Apical processes of hypopygium of male relatively short, divergent (fig. 13); hypopygium uniformly red; length of female 15.0-16.0, of male 13.0-15.0 mm ..... *jaakkoi* n. sp.
— Apical processes of hypopygium of male relatively long almost parallel (fig. 23); hypopygium reddish, with 1+1, median longitudinal stripes; length of female 17.0-18.0, of male 16.0-16.5 mm ..... *australis* n. sp.
17. Bright annulus of femora not very distinct, almost invisible on the anterior and median pair (fig. 207); pronotum uniformly red, of black color only a delicate line which follows the posterior border, between humeral angles; antero-lateral angles of collar not very protruding (fig. 138) ..... *cachabi* n. sp.
— Bright annulus of femora very distinct on all pairs (figs. 204-206); pronotum differently colored; antero-lateral angles of collar quite protruding (figs. 117, 128) 18
18. Antero-lateral angles of collar forming acute processes, forwardly directed (fig. 128); dark regions of anterior and posterior lobe of pronotum connected with each other (figs. 205) ..... *huacapistana* n. sp.
— Antero-lateral angles of collar forming rounded processes, directed to the sides (fig. 117, 148); dark regions of anterior and posterior lobe of pronotum not connected 19
19. Hemelytra short, subtruncate apically; lobuli of anterior lobe of pronotum with small apical tubercles (fig. 204) ..... *distinguendus* n. sp.
— Hemelytra more elongate; lobuli of anterior lobe of pronotum without apical tubercles (fig. 206) ..... *chanchamayo* n. sp.
20. Femora with more than 3 bright annuli (figs. 209, 210) 21
— Femora with 3 bright annuli (figs. 188, 196) 22
21. Anterior lobe of pronotum with two very long conical elevations, covered by numerous bristles; scutellum of usual form (fig. 171) ..... *carvalhoi* n. sp.
— Anterior lobe of pronotum with elevate lobuli, but without conical elevations; apex of scutellum extraordinarily elongate (fig. 170) ..... *zikáni* n. sp.
22. Chief colour of femora, as well as base of tibiae, black; femora with one bright basal annulus, not always very distinct, and two subapical ones, always distinct (fig. 188) ..... *triannulatus* n. sp.
— Chief colour of femora piceous or reddish, base of tibiae never black (fig. 196) 23
23. Species of rather long and slender body, with lanceolate hemelytra, like in *flavicans* (fig. 196); lobuli of anterior lobe of pronotum without apical tubercles; species from the Amazon region 24
— Species of shorter and larger body (figs. 188, 190); lobuli of anterior lobe of pronotum with distinct apical tubercles (fig. 30); species from Southern Brazil, Paraguay, Bolivia and Argentine 27
24. Longitudinal submedian posterior bands of anterior lobe of pronotum composed of extremely numerous very short bristles, as well as some longer ones (fig. 197); antero-lateral angles of collar with a small apical tubercle ..... *tumatumari* n. sp.
— The mentioned bands composed of not very numerous long bristles only (fig. 92); antero-lateral angles of collar rounded, simple or with a small apical tubercle 25
25. Bright subapical annulus of femora much less distinct than the submedian one (fig. 203); genitalia of male as in figs. 104-110 ..... *beebei* n. sp. (see also n° 14)
— Bright subapical annulus of femora as distinct as the submedian one (fig. 202); genitalia of male different 26
26. Antero-lateral angles of collar rounded, without subapical tubercle; field of short bristles present; genitalia of male as in figs. 96-101 ..... *lenti* n. sp.
— Antero-lateral angles of collar with distinct, subapical tubercles, no field of short bristles present; genitalia of male as in figs. 72-73 ..... *mendesi* n. sp.
27. Antennae uniformly black; 3rd article shorter than 1st; abdomen very broad, with the sides almost parallel (fig. 189); basal interior angle of anterior gonapophyses of female with very numerous macrochaetae (fig. 36) ..... *erythromerus* Spinola
— 3rd article of antennae with distinct basal whitish annulus; this article as long or longer as 1st; abdomen less broad, the sides distinctly convergent posteriorly (fig. 190); basal interior angle of anterior gonapophyses of female with few macrochaetae (fig. 35) ..... *annulatus* Spinola

Considerations upon the geographical distribution of groups of species are made; each of the taxonomically concepted groups of species is limited to a center of distribution (for groups of species see pg. 18), as follows:

Antillian center: group *maestralis*
Incasic center: group *distinguendus*
Amazonic center: group *flavicans*, also group *tumatumari*
Cariban center: group *maracaibo*
Tupi-guarani center: group *zikáni*
group *jaakkoi*
group *erythromerus*

No material was examined from the Central-american center, where the genus probably does not exist, and from the center Plateau Central, generally very poorly represented in collections, and which probably receives representatives from the Tupi-guarani center, from the groups *zikáni* and *erythromerus*. No material has been received from the regions south of the River Plate.

Some biological observations on *H. jaakkoi*, from southeastern Brazil, are communicated. The

species seems to be polyphagous. The egg (figs. 179-184) and the first postembryonal stage (fig. 185) are described. The resin which covers the legs of many *Apiomerinae* is obviously secreted by the 2nd — 5th stage and the adult; the insects of the first stage depend for the smearing of the anterior legs on adhesive substances not secreted by themselves, but found in nature.

The author would appreciate to be given the opportunity of examining additional material of the genus.

BIBLIOGRAFIA

AMYOT, C. J. B. & J. G. A. SERVILLE, 1843 *Histoire Naturelle des Insectes. Hémiptères.* Paris. XXXVI+675+6 pgs., 12 pls.

BERG, C., 1879, *Hemiptera Argentina.* Bonariae. VIII+9+316 pgs.

BERG, C., 1884. *Addenda et emendenda ad Hemiptera Argentina. Bonariae.* 213 pgs.

CHAMPION, G. C., 1898-1901. Insecta. Rhynchota. Hemiptera-Heteroptera. vol. II. In: *Biologia Centrali-Americana.* London. XVI+416 pgs., 22 pls.

DISTANT, W. L. 1903, Rhynchotal notes. —} XVI. Heteroptera: Family Reduviidae (continued), Apiomerinae, Harpactorinae and Nabinae. — *Ann. Mag. Nat. Hist.* (7) 11:203-213.

FABRICIUS, J. C., 1803, *Systema Rhyngotorum.* Brunsvigae, VI+314 pgs.

FRACKER, S. B. & S. C. BRUNER. 1924. Notes on some neotropical Reduviidae. — *Ann. Ent. Soc. Amer.*, 17:163-174, 1 fig.

HORN, W., 1926, Ueber den Verbleib der entomologischen Sammlungen der Welt (Ein Beitrag zur Geschichte der Entomo-Museologie). — *Supp. Entom.* 17:72-120.

LANE, J., 1943, The geographic distribution of Sabethini (Dipt. Culicidae). — *Rev. Ent.*, Rio de Janeiro. 14(3):409-429, 9 mapas.

LE PELETIER, A. L. M. & J. G. A. SERVILLE, 1825. *Encyclopédie Méthodique,* 10. Paris.

MILLER, N.C.E., 1942, On the structure of the legs in Reduviidae (Rhynchota). — *Proc. Royal Ent. Soc. London* (A) 17(4-6): 49-58, 21 figs.

PERTY, M., 1830-1834, *Delectus animalium articulatorum.* Monachii. 4+44+222 pgs., 40 pls.

SIGNORET, V., 1862, Description d'Hémiptères nouveaux de Jurimaguas et Moyabamba (Péron). — *Ann. Soc. Ent. France* (4) 2:579-588, pl. 15.

SPINOLA, M., 1837, *Essai sur les insectes Hémiptères. Rhyngotes,* ou *Héteroptères.* Paris, 383 pgs.

STAL, C., 1866, Bidrag till Reduviidernas kaennedom. — Oefv. Svenska Vet. Akad. Foerh. 23 (9):235-302.

STAL, C., 1868, Hemiptera Fabriciana. — *Svenska Vet.-Akad. Handl.* 7 (2):1-148.

STAL, C., 1872, Enumeratio Hemipterorum. II. — *Svenska Vet.-Akad. Handl.* 10(4):1-159.

WALKER, F., 1873, *Catalogue of the specimens of Hemiptera Heteroptera in the collections of the British Museum.* Part VIII.

Entregue para publicação em 5 de março de 1946.
Distribuído em 28 de março de 1947.

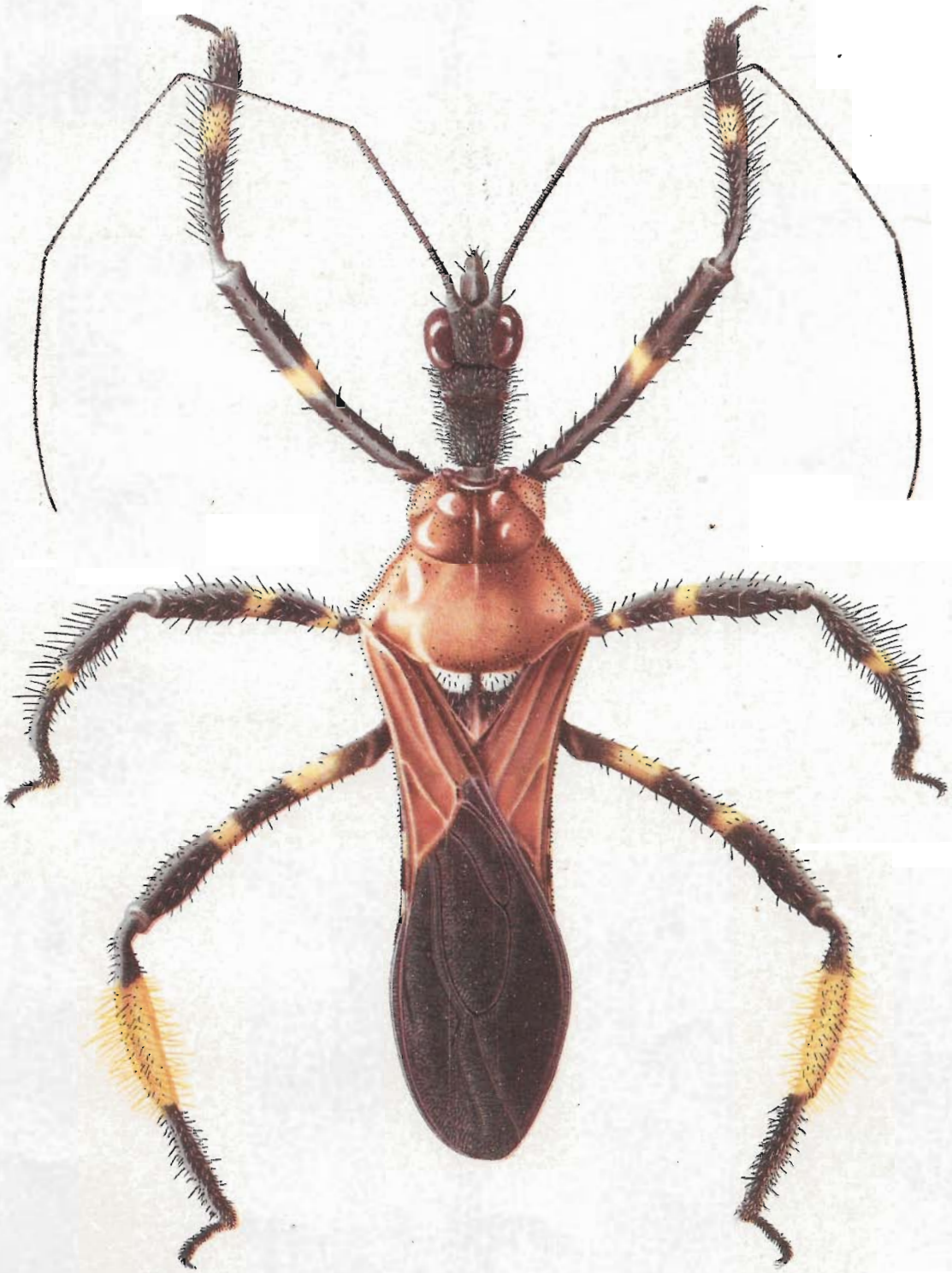


Fig. 186. *Heniartes jaakkoi* n. sp., Lemos Pereira pinx.

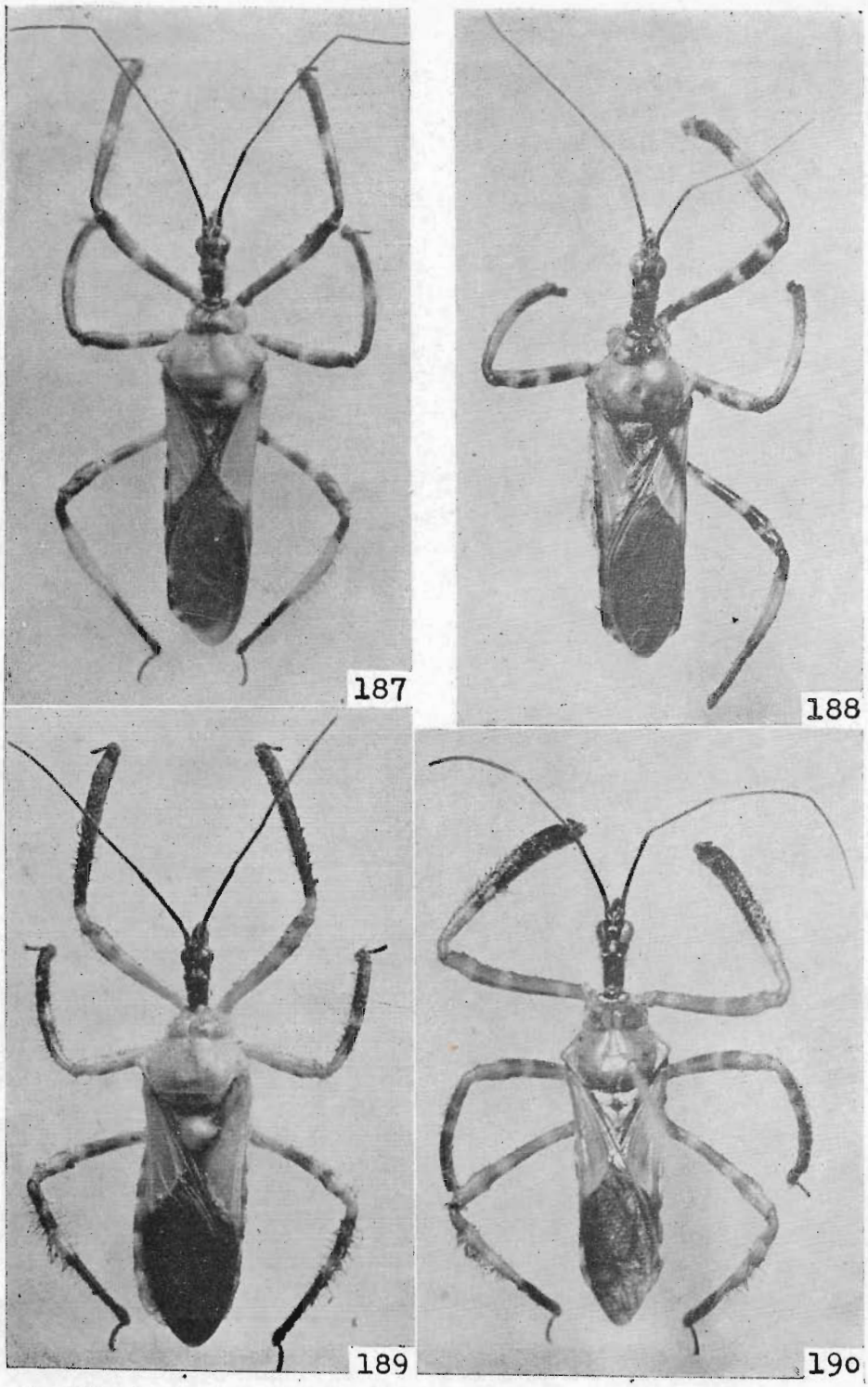


Fig. 187. *Heniartes australis* n. sp. — Fig. 188. *Heniartes triannulatus* n. sp. — Fig. 189. *Heniartes erythromerus* Spinola, 1837 — Fig. 190. *Heniartes annulatus* Spinola, 1837

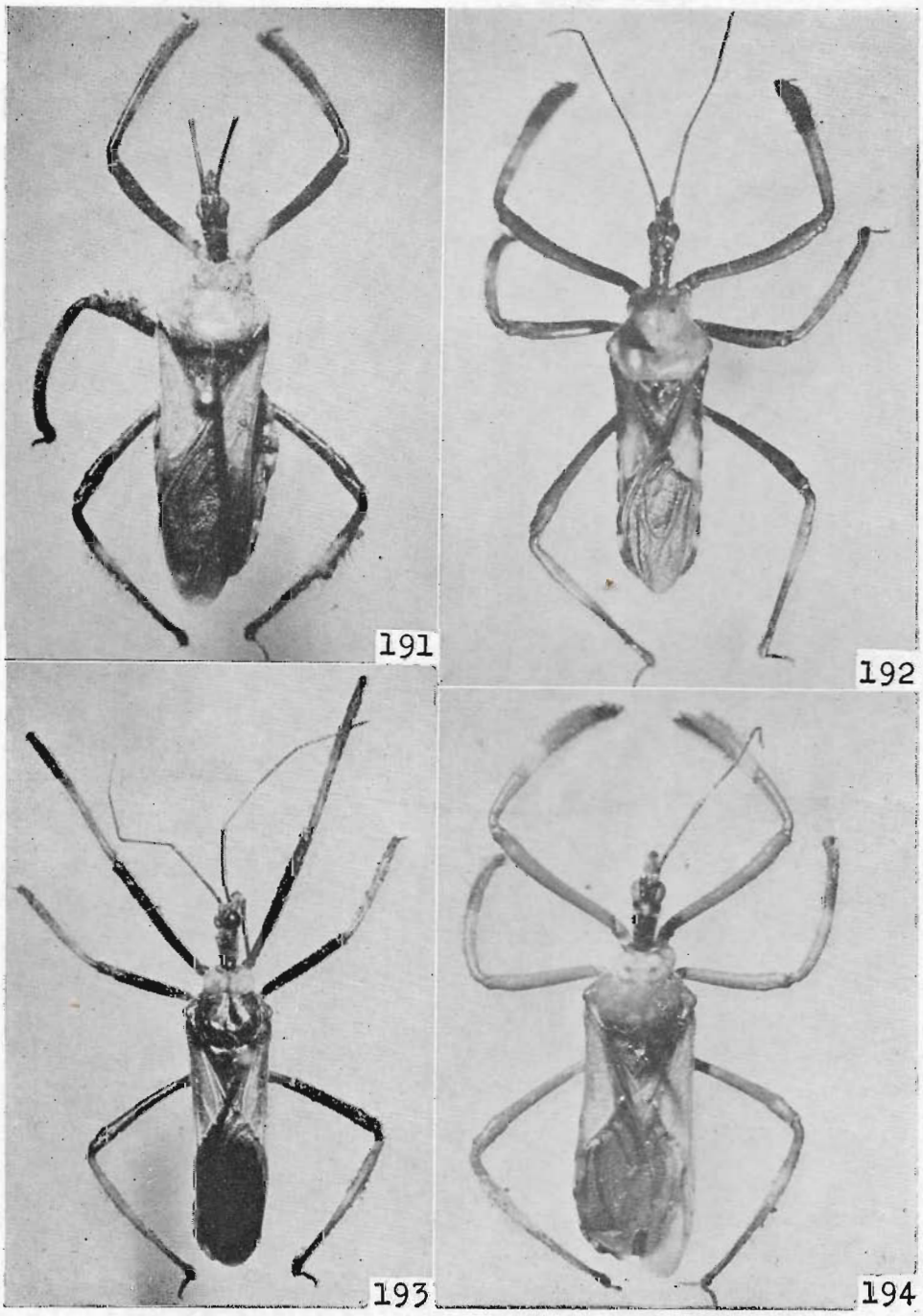
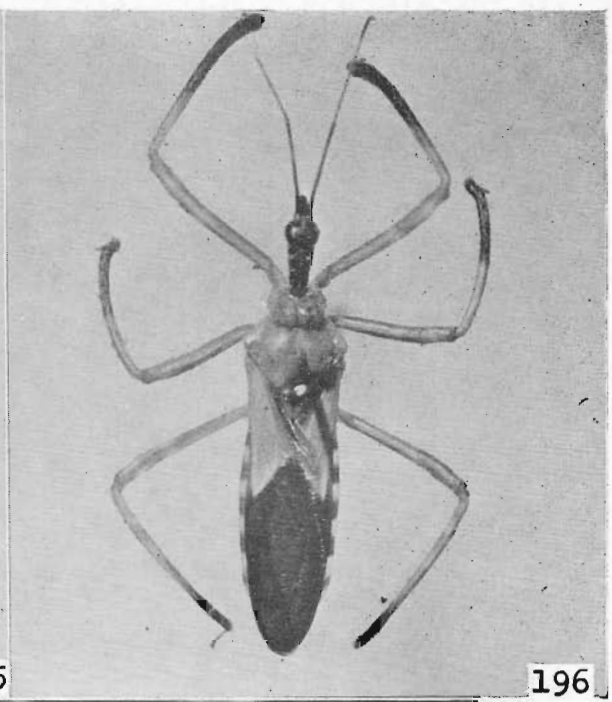


Fig. 191. *Heniartes birabéni* n. sp. — Fig. 192. *Heniartes nordestensis* n. sp. — Fig. 193. *Heniartes thoracicus* n. sp. — Fig. 194. *Heniartes travassosi* n. sp.



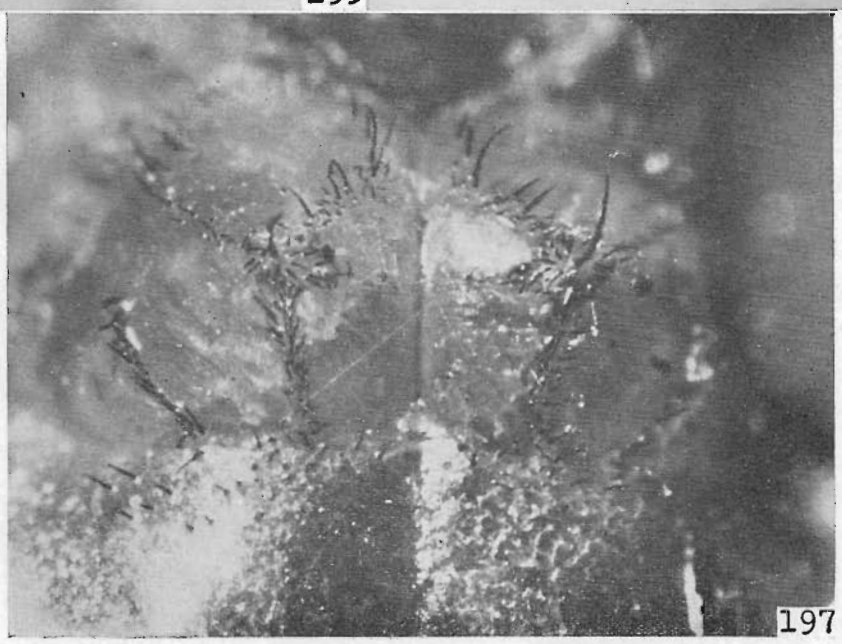


Fig. 195. *Heniartes maracaibo* n. sp. — Fig. 196. *Heniartes tumatumari* n. sp. — Fig. 197. *Heniartes tumatumari* n. sp., região central do pronoto, com cerdas.

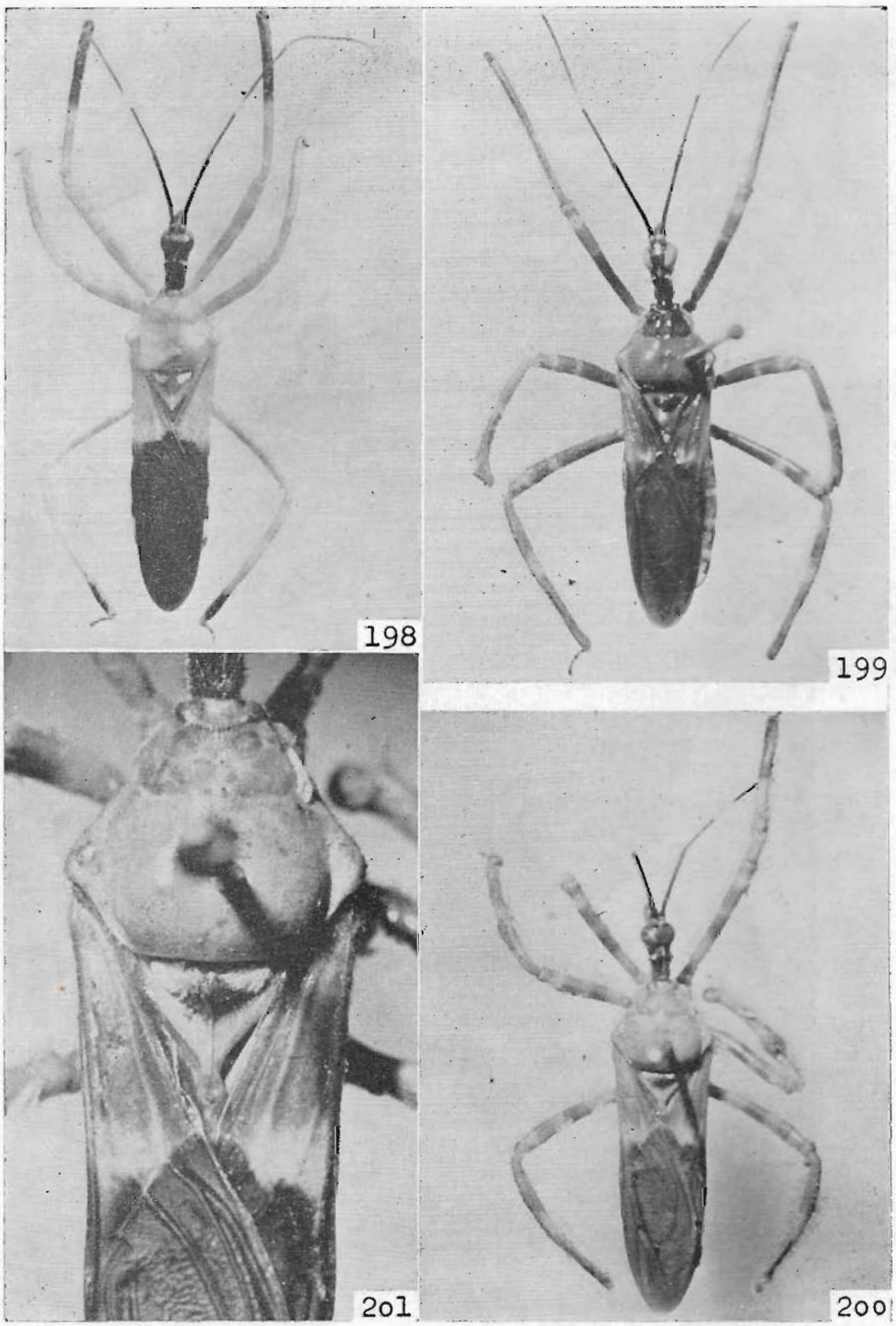
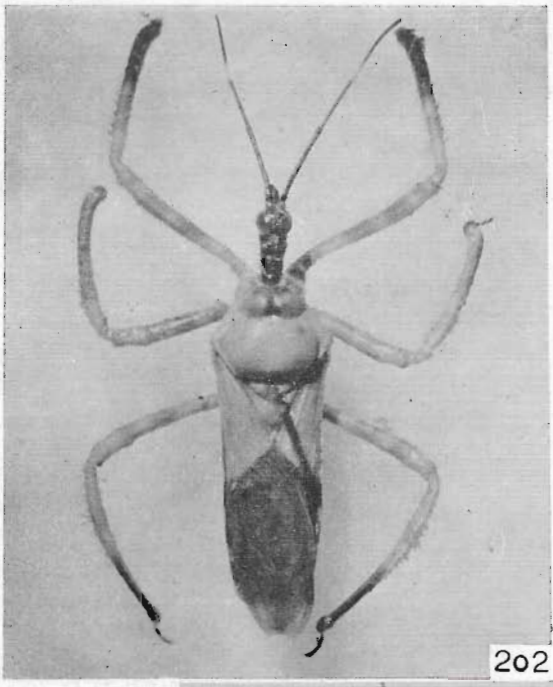
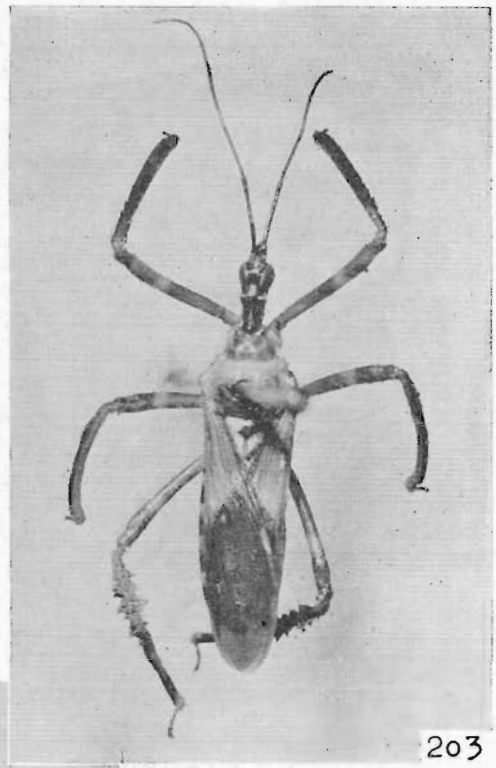


Fig. 198. *Heniartes flavicans* (Fabr.) — Fig. 199. *Heniartes geijskesi* n. sp. — Fig. 200. *Heniartes scutellatus* n. sp. — Fig. 201. *Heniartes scutellatus* n. sp., pronoto.





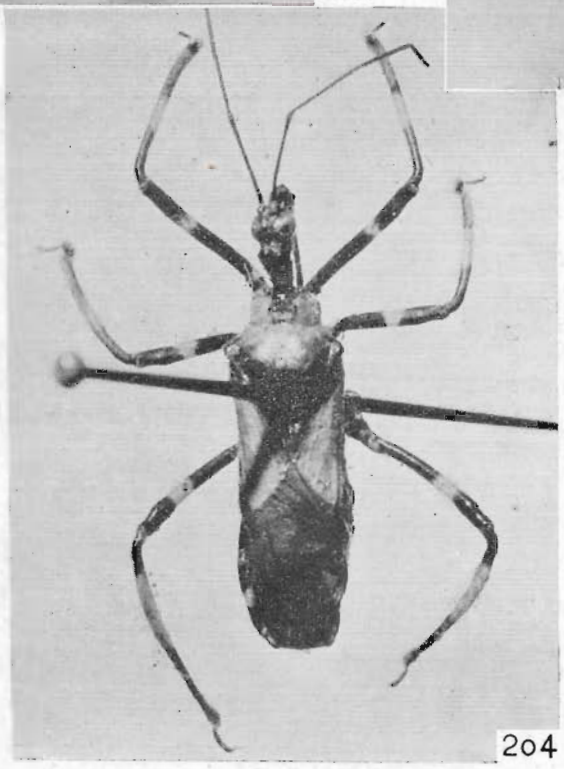


Fig. 202. *Heniartes lenti* n. sp. — Fig. 203. *Heniartes beebei* n. sp. — Fig. 204. *Heniartes distinguendus* n. sp.

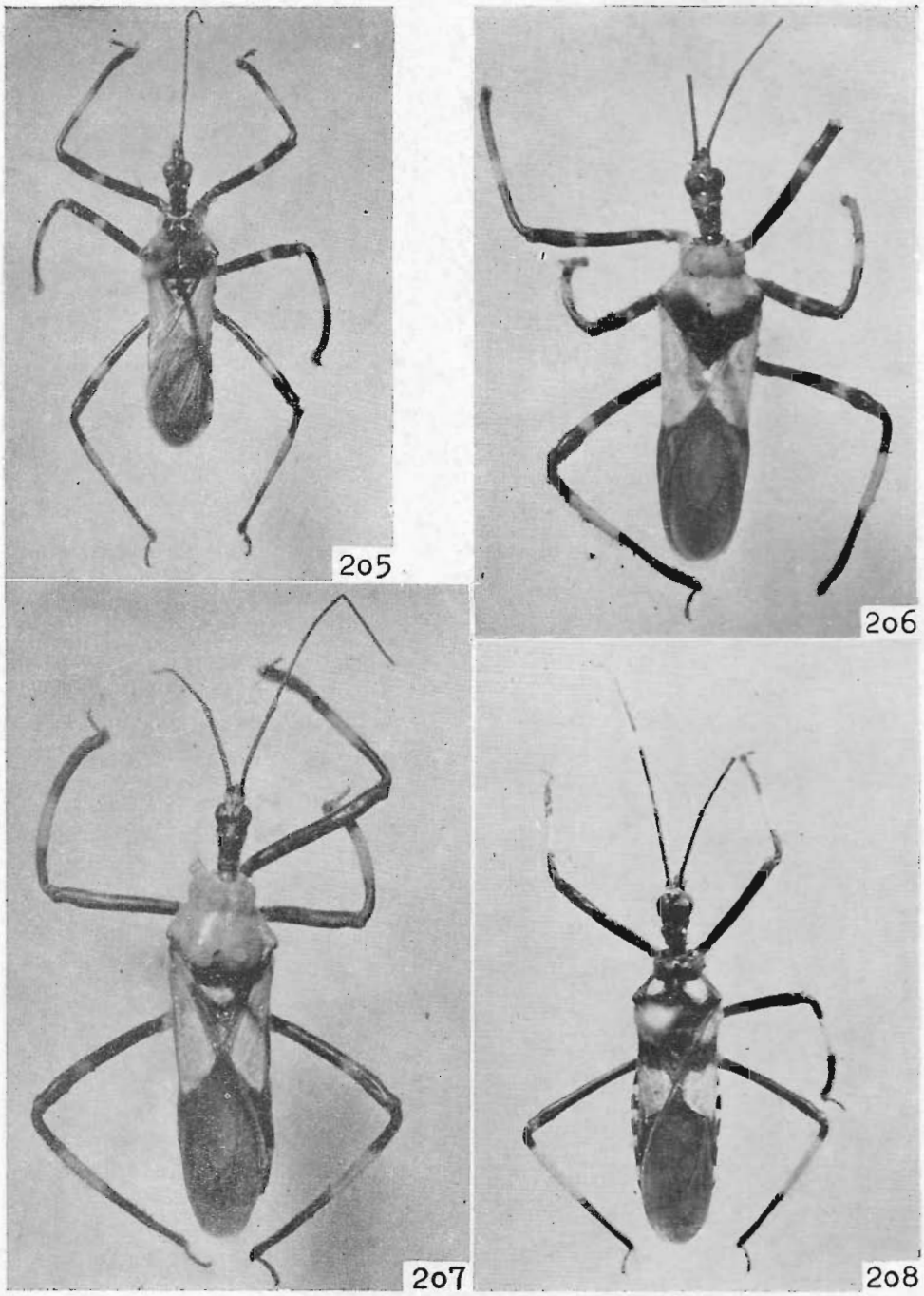


Fig. 205. *Heniartes huacapistana* n. sp. — Fig. 206. *Heniartes chanchamayo* n. sp. — Fig. 207. *Heniartes cachabi* n. sp. — Fig. 208. *H. maestralis* Fracker & Bruner, 1924.

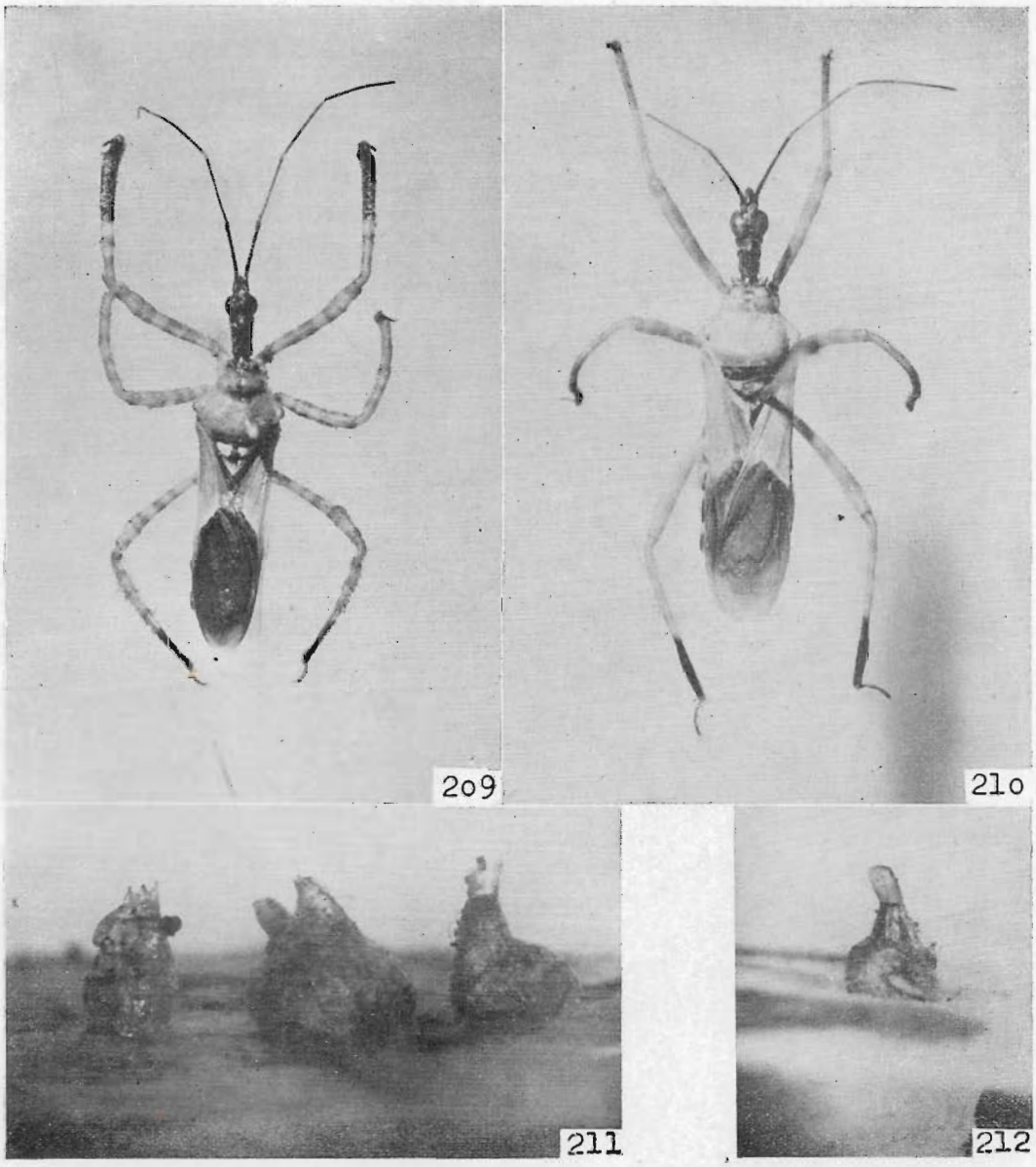
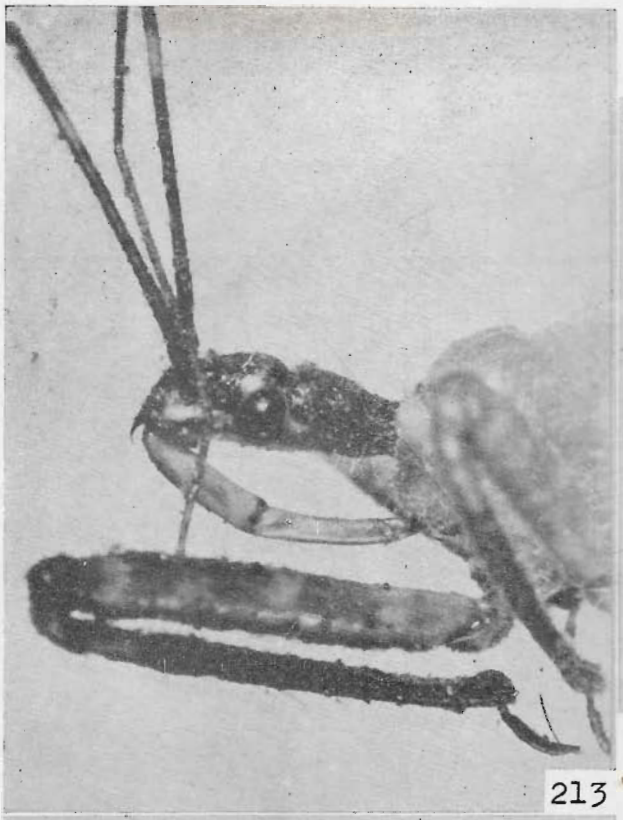


Fig. 209. *Heniartes carvalhoi* n. sp. — Fig. 210. *Heniartes zikáni* n. sp. — Fig. 211. Ovos de *Heniartes jaakkoi* n. sp. M. Ventel fot. — Fig. 212. Ovo de *Heniartes jaakkoi* n. sp. M. Ventel fot.



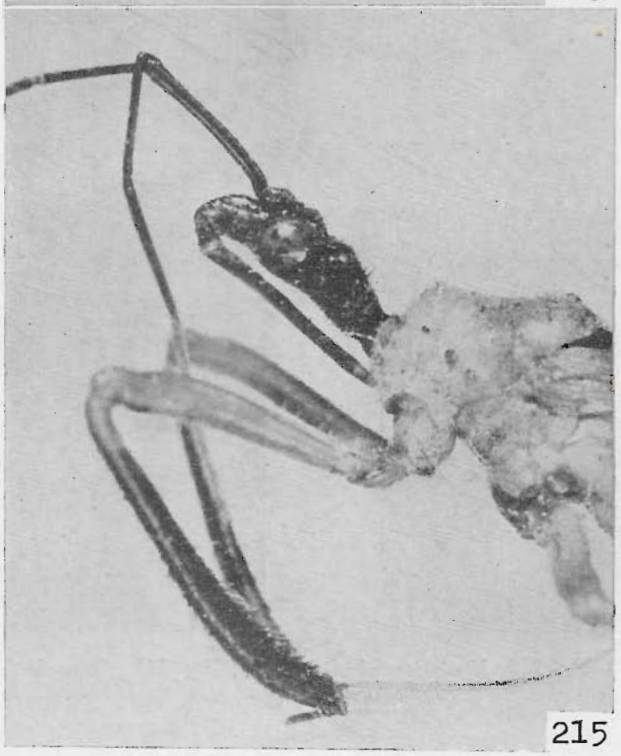


Fig. 213. *"Heniartes" theresina* Berg, 1879 (= *Pyrrhosphodrus theresina* (Berg)), parte anterior do corpo, aspecto lateral; fotografia do tipo, devida à gentileza do prof. MAX BIRABÉN. Fig. 214. *"Heniartes" theresina* Berg (= *Pyrrosphodrus theresina* (Berg)), aspecto dorsal: tipo. Fig. 215. *Heniartes mayri* Berg, 1844 (= *Heniartes erythromerus* Spinola, 1837), parte anterior do corpo, aspecto lateral; fotografia do tipo, devida à gentileza do prof. MAX BIRABÉN. Fig. 216. *Heniartes mayri* Berg, aspecto dorsal.

CONTRIBUTIONS TO THE CLASSIFICATION OF THE LORICARIID CATFISHES

By

WILLIAM A. GOSLINE

Entregue para publicação em 1 de Setembro de 1945.
Distribuído em 16 de Outubro de 1947.

CONTRIBUTIONS TO THE CLASSIFICATION OF THE LORICARIID CATFISHES

WILLIAM A. GOSLINE

INTRODUCTION

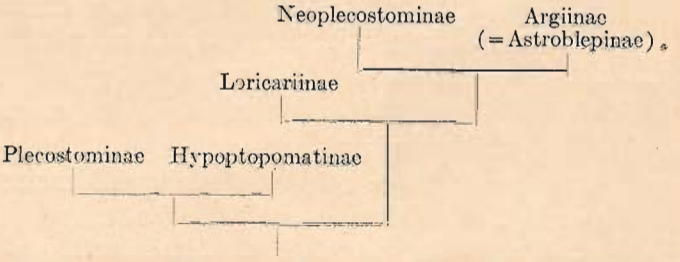
The Loricariidae, though limited to the fresh waters of South and Central America, is probably the largest family of existing catfishes. Well over 400 species are now recognized. More than half of these species have been described since the last thorough revision of the family as a whole, or of any part of it for that matter, was made. Loricariid generic and specific names have been piled one after another on the old classificational structure set up by Regan and Eigenmann over thirty years ago. The result is that this structure is now both top-heavy and obsolete. The nature, limits, and relationships of Loricariid subfamilies, genera, and species are badly in need of reexamination and reevaluation. Until such reevaluation is made for the forms already described, a further addition of names can only add to the already considerable confusion. Unfortunately, Loricariid reclassification must be undertaken piecemeal. No museum in the world at the present time contains representatives of many more than two-thirds of the recognized genera, not to mention species. [1]

The present papers [2] have undertaken the reclassification of three of the sections of Loricariidae in which the Museu Nacional material was adequate. The nature of the three papers dealing with these sections varies considerably. The first is an attempt to work out on a phylogenetic basis a classification of the subfamilies. The second is a synopsis of the genera of one of these subfamilies. The last presents preliminary material for a revision of the Southeastern Brazilian species of *Plecostomus*, the largest [3] and probably the most difficult Loricariid genus.

I. SOME LINES OF STRUCTURAL DEVELOPMENT USED AS A BASIS OF SUBFAMILY CLASSIFICATION

INTRODUCTION

The present paper constitutes an attempt to construct a phylogeny for the fishes within the family Loricariidae (including Astroblepinae). Aside from Regan's schematic diagram of subfamily relationships (1904, *Trans. Zool. Soc. London*, vol. 17, pt. 3, p. 201), redrafted below, work on the



classification within this family has largely confined itself to the delimiting of groups, leaving to the future the problem of the interrelationships between these groups. This has doubtless been a correctly cautious approach, particularly in view of the nature of the Loricariidae.

This family is probably the most specialized, as well as the largest, catfish family. There is no known connecting link between it and other families which may be used as a starting point for Loricariid phylogeny. All of the subgroups of the family have so many specializations that it is only figuratively speaking that one can say that one subgroup is more primitive than another. The only sub-

---

[1] A rough calculation indicates that the Museu Nacional in Brazil, the California Academy of Sciences and the Museum of Comparative Zoology in the United States, and the British Museum each contain examples of about two-thirds of the Loricariid genera.

[2] Submitted for publication September 1, 1945.

[3] *Loricaria* (sensu latu) contains more described species, but the genus should probably be broken up (see first article).

family which is completely unarmored and which rather resembles normal catfishes in external appearance — the Astroblepinae — was considered by Regan to be the most advanced of the lot. There is thus little opportunity to build a phylogeny by going from the simple to the complex, for all Loricariids are complex. The result is that the author has necessarily laid considerable stress on a rather different approach to phylogenetic study, that of "sequential stabilization of genetic patterns". [4]

The development of phylogenetic conceptions within the Loricariidae is important for two reasons. First, a well-founded phylogenetic classification would aid in solving the problems of fresh-water fish distribution in South America and might throw some light on the question of the geologic history of the southern continents. For if a phylogeny can be worked out within the family, we may get some indication of the group from which the Loricariids arose. If the group ancestral to the Loricariidae is eventually shown to be the Ariidae, one interpretation of fresh-water fish distribution and geologic history will be strengthened. If it can be shown that the Loricariids are most closely related to some Asiatic or African catfish family, a very different interpretation will be indicated. If it turns out that Loricariids arose from some other South American fresh-water catfish family, this will have still another significance in relation to the origin and evolution of the South American fauna. These points are taken up here because, though this paper will solve none of the problems involved, it was undertaken with the relationship between catfish evolution and continental history in mind (for a discussion of this relationship, see the author's paper of 1944, *An. Acad. Bras. Cie.*, vol. 16, n.° 8, pp. 211-223).

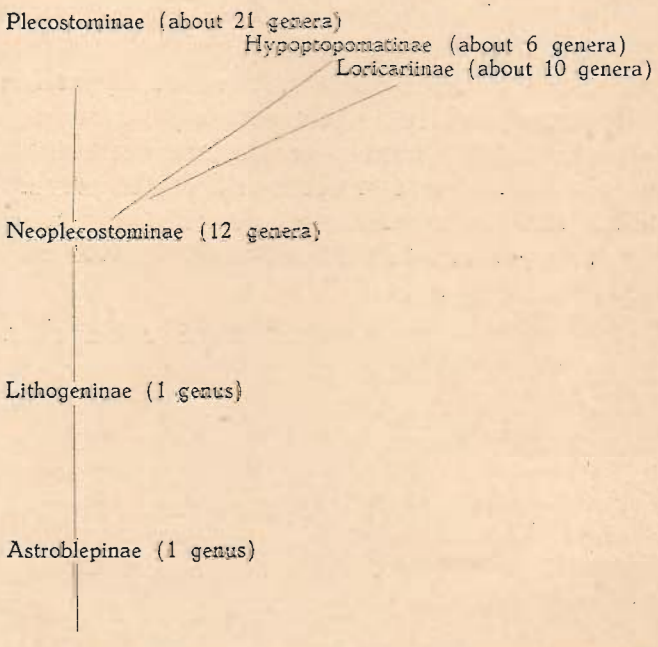
The second reason for trying to work out a phylogeny within the Loricariidae is that a classification based on evolutionary pattern is usually sounder than one built on the artificial grouping system. This is particularly true of the Loricariidae, a family which, in the author's opinion, is evolving rapidly at the present time and in which the species, genera, and subfamilies fit into discrete, well-defined pigeon holes less often than usual. Even if the Loricariids are the most specialized of the catfishes, even if most of them have enclosed themselves in a bony shell, which in turn has caused something of a stereotyping of internal structure, these things do not seem to be hindering the vitality and evolutionary proclivity of the group.

[4] This method has been relied upon so heavily that Ferris' statement of the concept (1943, *Microentomology*, vol. 8, pt. 1, p. 6) is well worth quoting here: "The processes of evolution consist not merely, of endless change, but also of the setting of limits within which further changes are confined. It is thus in part a process of 'sequential stabilization of genetic patterns'. It involves the loss and limiting of capacities as well as the attainment of them."

SUMMARY

The body of this paper will be so full of obscure generic names and of descriptions of characters, internal and external, which nobody has ever seen, that it seems best to summarize the results at the start. This summary can then be used as a sort of guide through the rest of the paper.

The author's conception of the phylogenetic relationships of the different subfamilies, oversimplified, is diagrammed below. A comparison of this diagram with that of Regan (given above) will show that the two differ considerably.



In dealing with the reasoning upon which this diagram is based, it seems best to start with a hypothetical Loricariid ancestor. In such an ancestor it would seem logical to postulate jaws with bands of villiform teeth of the normal catfish type and a many-rayed pectoral fin. (Other structures might also be

hypothesized, but for the present work they would be gratuitous.) All Loricariids except *Astroblepus* have a single row of teeth, and all but *Astroblepus* and *Lithogenes* have a pectoral count of I 6, except for a few species which sometimes have I 5. *Astroblepus*, however, has two or more rows of teeth, and the pectoral count is said to vary between I 9 and I 12. Chiefly because of these two characters, the author believes that the Astroblepinae split off from the Loricariid stock before the other subfamilies evolved. There has been some argument as to whether the Astroblepinae never had scutes or whether they secondarily lost them. Whatever the answer to this question may be, it does not affect the present reasoning as to relationships.

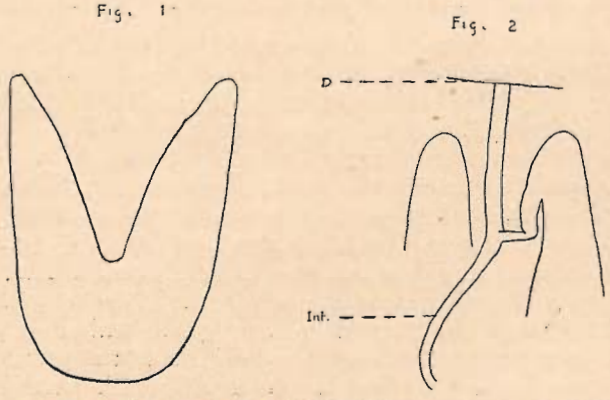
Lithogenes, with a pectoral count of I 8, seems to fall in nearly all respects in the center of the gap between the Astroblepinae and the lower Neoplecostominae. It is in fact only because of this genus that the author has included the Astroblepinae in the Loricariidae at all.

Excluding the Astroblepinae and Lithogeninae, four Loricariid subfamilies remain to be dealt with. Two of these subfamilies, the Hypoptopomatinae and the Loricariinae, are here considered to be specialized offshoots of the central Loricariid stock. The first of these is separated chiefly by the fact that the transverse processes of the pectoral girdle are exposed on the surface of the chest. In other subfamilies these processes are covered either by flesh or by small platelets. This does not seem to be a very basic character, but it appears to split off a rather similar group of fishes and does not seem to occur elsewhere in the Loricariidae. The Loricariinae may likewise be split off by the single character of the depressed, elongate caudal peduncle. This is another character that could have developed more than once, and there is some evidence, as will be pointed out later, that the subfamily is biphyletic.

If the Loricariinae and Hypoptopomatinae are admitted to be side lines (they may well represent two divisions of a single side line), they might have been derived from either the Plecostominae or the Neoplecostominae. Of the two possibilities, the Plecostominae shows a whole series of specializations not found in the Loricariinae or Hypoptopomatinae, e. g., the total loss of pharyngeal teeth, the anus located close to the anal origin, and the presence of a dorsal spine locking mechanism. The lower forms of Neoplecostominae, however, possess almost no specializations which the Hypoptopomatinae and Loricariinae do not have. It is through this process of elimination, rather than because of any positive indications of relationship, that the Neoplecostominae has been postulated as belonging to a stock ancestral to the Loricariinae and Hypoptopomatinae.

Because of the Plecostomine specializations mentioned above, plus many others, the Neoplecostominae is thought to be ancestral to this subfamily as well. However, in the case of the Plecostominae there is no one character or group of characters by which it may be easily and securely separated from the Neoplecostominae. The genera of these two subfamilies practically merge into one another, and the subfamily dividing line might have been made with almost equal justification at at least two other places.

The phylogeny proposed above encounters one very serious difficulty. That is that *Pogonopomoides*[5] *parahybae* was found to have what seems to be a large[6], well-developed and functional posterior section to the air bladder (text figs. 1 and 2). If this is a true air bladder, it is a character both primitive and hitherto unknown to any Loricariid.



Figs. 1 and 2. Outline of posterior section of air bladder in *Pogonopomoides parahybae*. Front of fish towards top of page. Fig. 1. Ventral view. Fig. 2. Dorsal view of prongs of air bladder showing connection of right prong with alimentary canal. D. = diaphragm. Int. = intestine.

[5] This generic name is used here for the first time for the species hitherto known as *Rhinelepis parahybae*. The characters distinguishing this genus are given in the second article of this series.

[6] In a specimen 355 mm in total length, the posterior air bladder is 80 mm long.

Yet in many other respects *Pogonopomoides parahybae* shows what, according to the above phylogenetic conceptions, would be called advanced characters.

FAMILY DEFINITION AND HISTORY OF LORICARIID CLASSIFICATION

The Loricariidae seems to have been first recognized as a family by Agassiz (1829, *Selecta Genera et Species Piscium*, p. 1), who called the group the Gonyodontes. However, the separation of this family from other catfishes was not accepted by Cuvier and Valenciennes, Günther, etc., and a family separation was not again made until Gill in 1872 (*Smithsonian Misc. Coll.*, vol. 9) established the present designation of Loricariidae. The only source of serious argument over the classification of the family since this time has to do with whether the Astroblepinae should be included in it or considered as a separate, if closely related, family. Regan strongly advocated inclusion, and Eigenmann equally strongly advocated separation. The present author has quite admittedly vacillated over the question, but now favors inclusion on the basis of the intermediate nature of *Lithogenes*, described, ironically enough, by Eigenmann.

Regan, in his classification of the catfishes (1911, *Ann. Mag. Nat. Hist.*, ser. 8, vol. 8, pp. 553-577), defines the Loricariidae (including the Astroblepinae) as follows:

> Body naked, or armoured with bony scutes, which anteriorly form five longitudinal series on each side. Gill-membranes broadly united to isthmus. Dorsal fin anterior; anal short; pelvics below or in advance of the dorsal. Mouth inferior, with expanded lips forming a sucker; praemaxillaries movably articulated with mesethmoid; jaws toothed; palate toothless; a pair of maxillary barbels. Palatine articulating with anterior end of lateral ethmoid; pterygoid and mesopterygoid absent. Post-temporal absent; supra-cleithrum a large plate united with pterotic and supra-occipital above, prootic and exoccipital below, and parapophysis of fourth vertebra behind; cleithrum transversely expanded; mesocoracoid present. Vertebrae 27 to 38 (10-18+14-26); caudal vertebrae compressed, with neural and haemal spines more or less expanded; free praecaudals without parapophyses, with sessile ribs; a pair of very strong sessile ribs borne by the sixth vertebra, which is rigidly united to the fifth and articulates with the seventh by a hinge which restricts lateral movement; complex vertebra united to fifth and to skull by suture or ankylosis; parapophyses of fifth vertebra absent, of fourth forming with supra-cleithra and exoccipitals a pair of capsules opening laterally beneath the notched or perforated supra-cleithral plates; air-bladder reduced to two sacs enclosed in the capsules.

The only objection the present author can find to this definition is that, as mentioned above, the posterior section of the air bladder, as well as the two anterior "enclosed sacs", appears to be very much present in at least one form. Of additions to the above characterization, only the following seem worth mentioning: (1) all the Loricariids examined seem to have the ability of moving the two halves of the jaws separately, and *Plecostomus* in life seems to move the halves of the lower jaw alternately as a method of progression; and (2) the substitution in all except some Loricariinae of gill rakers by structures that very much resemble the gill filaments.

As to classification within the family, Linnaeus considered all of its species known to him as belonging to the single genus *Loricaria*. Cuvier and Valenciennes (1840, *Hist. Nat. Poissons*, vol. 15) recognized six genera which they placed in two unrelated groups — one naked, the other with scutes. The scuted Loricariids were divided by Kner (1854, *Denkschr. Akad. Wiss. Wien*, vols. 6 and 7) into two "Hauptgruppe", the "Loricarinen" and the "Hypostomiden", more or less equivalent to the Loricariinae and Plecostominae respectively. Gill (1872, op. cit.) considered the Argiidae (= Astroblepidae) as a family separate from the Loricariidae. Eigenmann and Eigenmann (1890, *Occ. Pap. Calif. Acad. Sci.*, vol. 1) followed this separation and divided the Loricariidae into three subfamilies, the Loricariinae, Hypoptopominae, and Plecostominae. Regan's monograph (1904, op. cit.) reincluded the Argiidae in the Loricariidae, which he divided into five subfamilies, Plecostominae, Hypoptopomatinae, Loricariinae, Neoplecostominae, and Argiinae. Eigenmann (1910, *Repts. Princeton Univ. Expeds. Patagonia*, 1896-1899, vol. 3, pt. 4, p. 404) accepted Regan's arrangement except that he continued to consider the Astroblepids as a separate family. In 1911 (op. cit) Regan almost exactly restated his 1904 arrangement, but based his arrangement on almost entirely different characters. No further work has been done on the classification of the Loricariidae at subfamily level.

BASES OF SUBFAMILY CLASSIFICATION USED UP TO NOW

As has just been said, the higher classification of the Loricariidae used until now is based on Regan. Except that Eigenmann continued to consider the Astroblepids a separate family, he accepted (1910, loc. cit.) both the arrangement and the characters for separating the subfamilies used by Regan in 1904. Just why, therefore, Regan in 1911 (op. cit.) should have used a whole series of different characters to arrive at a slight variation in his 1904 arrangement is not clear to the present author. In any case subfamily classification of the Loricariidae has rested until now on Regan's two works (1904 and 1911), which may be combined as follows:

1a. Pharyngeals toothless (1911), lower and fourth upper pharyngeals not toothed (1904); haemal spines not bifid (1911), haemal spines all simple (1904); supra-cleithral plate extending downwards, its inner surface attached to the outer edge of the cleithrum, but not forming a definite articulation with it (1911); inner edge of metapterygoid attached to lateral ethmoid (1911); body usually armoured (1911), upper part of the body protected by bony scutes (1904); hypocoracoids interlocking (1911); anterior rudimentary ray of ventral normally shaped, but internal and directed forwards (1904).

2a. Lower transverse portion of clavicles and coracoids not exposed (1904); margin of snout naked or covered with small granular plates (1904).

Plecostominae

2b. Lower transverse portion of clavicles and coracoids exposed (1904); margin of snout composed of more or less firm plates (1904).

Hypoptopomatinae

1b. Lower and fourth upper pharyngeals toothed (1911 and 1904); anterior haemal spines bifid for reception of anal basalia (1911), haemal spines of the vertebrae above the anal fin bifid (1904); supra-cleithral plate scarcely decurved, its lower surface with a transverse ridge fitting a groove on the upper edge of the supra-cleithral [7] expansion external to the head of the bone (1911).

3a. Body armoured (1911), upper part of the body protected by bony scutes (1904); metapterygoid attached to lateral ethmoid (1911); lower portions of cleithra transverse (1911); hypocoracoids interlocking below (1911).

4a. No anterior rudimentary ray of ventral (1904); caudal peduncle elongate and strongly depressed (1904).

Loricariinae

4b. Anterior rudimentary ray of ventral internal, plate-like (1904); caudal peduncle cylindrical (1904).

Neoplecostominae

3b. Body naked (1911 and 1904); metapterygoid small, not reaching skull (1911); cleithra running somewhat forward to their symphysis (1911); hypocoracoids tapering forward below, not interlocking (1911).

Argiinae

The logical starting point for the present paper seemed to be to dissect the five genera which Regan's subfamily names were based upon and which Regan almost certainly used in the above classification. This was done. These forms have been supplemented by dissections of available genera which looked as if they might be intermediates between the five subfamilies recognized by Regan. The net effect, of course, has been to give Regan's classification and its bases as severe a test as possible. The result has not been a discarding of Regan's arrangement, but chiefly a reversing of its order with a somewhat changed evaluation of one of the subfamilies, and the supplanting of some of the above characters by others. By and large, though, the greatest criticism that can be made of Regan's classification is one that could have been guessed beforehand. That is, the subfamilies as defined by Regan are too distinct and well-defined to be natural, and the characters used in separating them are much too clear-cut to be true.

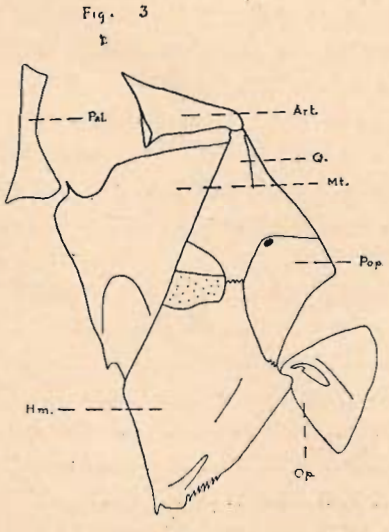
TERMINOLOGY

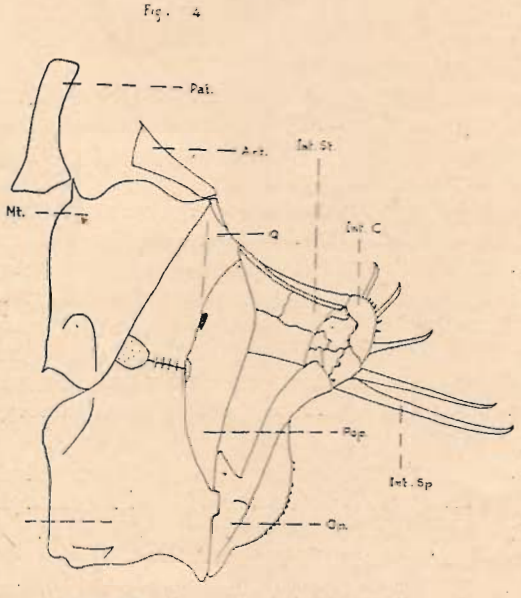
As usual, the question arises as to what names to use for certain structures. In this paper the terminology of Regan will, in general, be followed. This is not because the author believes that Regan's terminology is better than others, but because most of the comparative morphology of the Loricariids has been done by that author. Consequently, using Regan's terminology at least has the advantage of facilitating comparison with his work.

There are, however, two points at which a somewhat different osteological nomenclature than that employed by Regan has been found advisable. What Regan calls the first

[7] Regan must have intended "cleithral", not "supra-cleithral".

ventral ray is here called the "lateropterygium", following Shelden (1937, *Ann. New York Acad. Sci.*, vol. 37, p. 33). A more difficult point is that of the "interopercle". Since much of the generic classification of the Plecostominae set up by Eigenmann and Regan revolves around the movability of the "interopercle", it has been somewhat disconcerting to find no such bone. The present author is of the opinion that what is generally called the interopercle in the Plecostominae is merely a patch of fused dermal plates (text figs. 3 and 4). However, since this region is of such importance in the classification of the Plecostominae, it is here called the "interopercular area".





Figs. 3 and 4. Cheek armor and suspensorium of left side, ventral view. Cartilage stippled. Fig. 3. *Plecostomus commersonii*. Fig. 4. *Ancistrus cirrhosus*, with cheek spines everted. Lowering of the opercle forces the tips of the spines backwards and downwards until they are more or less sheathed above by the opercle. Pal. = palatine. Art. = articular. Q. = quadrate. Mt. = metapterygoid. Pop. = preopercle. Op. = opercle. Int. St. = «interopercular» strut, probably made up of fused dermal plates. Int. C. = «interopercular» cushion, probably also dermal plates. Int. Sp. = «interopercular» spine. Hm. = hyomandibular.

MATERIAL USED AND ACKNOWLEDGEMENTS

The following species have been dissected:

Plecostomus commersonii, Harttia loricariiformis, and *Loricaria steindachneri* sent in from the Rio Paraíba do Sul, State of Minas Gerais, by Dr. Rafael Figueira and Mr. Enéas Nunes de Miranda;

Plecostomus strigaticeps from the Rio Mogi-Guaçú, State of São Paulo, sent by Dr. Otto Schubart;

Neoplecostomus granosus sent from Santa Teresa, State of Espírito Santo, by Mr. A. Ruschi;

Parotocinclus sp. collected in Rio Perdido, State of Espírito Santo, by A. Ruschi, G. S. Myers, and A. Carvalho;

Ancistrus cirrhosus sent from the vicinity of Pevas, Peru, by Mr. W. G. Scherer.

Two specimens of *Astroblepus eigenmanni* were very kindly sent by Mr. Cecil Miles of Mariquita, Colombia, through the services of Mr. M. Gordilho of the Brazilian Embassy in Bogotá. [8]

The author would like to acknowledge his obligation to all of these individuals.

The following species were already in the Museu Nacional collections: *Hypoptopoma guentheri, Kronichthys heylandii, Hemipsilichthys gobio,* and *Loricaria cataphracta*. For permission to skeletonize these forms the author wishes to thank Heloisa Alberto Torres, Director of the Museu Nacional.

[8] The specimens of *Astroblepus* unfortunately did not arrive until the present paper was completed, and in fact until within three weeks of the author's departure from Brazil. A well-rounded discussion of Loricariid phylogeny should probably give one-third to one-half of its space to the relationship between the Astroblepinae and the other Loricariids. Under the circumstances, however, it has been impossible to rewrite this paper so as to give the specimens of *Astroblepus* the emphasis they deserve.

For seeing this and the two following articles through the press the author wishes to thank the editorial staff of the Museu Nacional. The editing of these particular articles has been especially difficult as they are in English and because of the author's absence from the country.

Finally, the author has been immeasurably aided by his wife in all the processes of putting these three papers together.

ALIMENTARY SYSTEM AND RELATED STRUCTURES

Under the head of alimentary system teeth, gill rakers, pharyngeal teeth, intestine, and air bladder will be taken up. The form and degree of development of all these structures except the air bladder are more or less correlated with one another. For example, *Loricaria,* with comparatively few teeth, has rather normal gill rakers, well-developed pharyngeal teeth, and a comparatively short intestine. *Ancistrus,* by contrast, has numerous fine teeth, the gill rakers replaced by structures resembling the gill filaments, no pharyngeal teeth, and a very elongate intestine.

The highly specialized and characteristic teeth of most Loricariidae have never been used as a subfamily character. They are either simple, bilobed, or secondarily spoon-shaped. Simple teeth occur in certain species of *Astroblepus,* and in certain genera and species of Neoplecostominae. In the bilobed tooth type the second lobe is usually small. However, both lobes may be about equal in certain species of *Astroblepus,* in the lower jaw of *Lithogenes,* and in *Upsilodus.* The (secondarily) spoon-shaped type of tooth occurs in a few genera of Plecostominae. All other Loricariids have bilobed teeth with one main lobe and one small lateral lobe on the outside of the tooth.

Before proceeding it is perhaps worth pointing out that the variable teeth of the Astroblepinae, Lithogeninae, and Neoplecostominae would seem more primitive than the highly peculiar, rather stereotyped tooth type found in the Plecostominae, Hypoptopomatinae, and Loricariinae. The very stereotyping of the same tooth type in these three subfamilies argues for a rather close interrelationship between them.

In number of teeth the Loricariids vary from about 3 to about 150 in one side of each jaw. In the single genus *Plecostomus* the tooth number varies from 17 to 85. The number of teeth, though useful at certain points in the classification of the Loricariidae, is of little value in subfamily definition. Generally the teeth are in about equal numbers in each jaw. In two Plecostomine genera and certain species of *Loricaria,* there are significantly fewer teeth in the upper than in the lower jaw. In *Lithogenes* the reverse is said to be true.

Astroblepus has no gill rakers.

Loricaria and *Hemiodontichthys* have a normal, if somewhat rudimentary set of gill rakers. All the other forms, including *Harttia* and *Sturisoma,* have the gill rakers replaced by fleshy folds closely similar to the gill filaments themselves and often about equal to them in number. Whether these folds serve as a fine strainer or supplement the respiratory function of the true gill filaments or both is impossible to say at the moment.

The above features have not been used in Loricariid classification, but the pharyngeal teeth, which lie directly behind them, constitute one of the characters used by Regan in making a primary division of the subfamilies. According to Regan (see above) pharyngeal teeth are absent in the Plecostominae and Hypoptopomatinae and present in the Loricariinae, Neoplecostominae, and Argiinae. Unfortunately, this simple all or none picture was not obtained by the present author. Rather, the pharyngeal teeth seem to fit into something of a graded series as follows:

I. Lower and fourth upper pharyngeals toothed on entire surface:
   - A. Pharyngeal teeth more or less molariform:
     Loricaria cataphracta
   - B. Pharyngeal teeth villiform:
     Astroblepus in the Astroblepinae
     Loricaria steindachneri and *Harttia* in the Loricariinae
     Kronichthys and *Neoplecostomus* in the Neoplecostominae

II. Lower pharyngeals with minute teeth along the posterior, mesial edge; upper pharyngeals with minute teeth:
   Parotocinclus and *Hypoptopoma* in the Hypoptopomatinae

Pogonopomoides in the Neoplecostominae

III. Lower pharyngeal teeth granular; upper apparently lacking:

Hemipsilichthys in the Neoplecostominae

IV. Pharyngeal teeth lacking above and below:

Ancistrus and *Plecostomus* in the Plecostominae

Besides the fact that the pharyngeal teeth form a graded series, they are a poor subfamily character for practical use as they are often so small as to be easily missed. It seems to the present author that the best that can be done with the pharyngeal teeth is to say that they are absent in the Plecostominae and usually present in other groups. They are significantly better developed in *Loricaria* (particularly *L. cataphracta*) and *Hemiodontichthys* than in any of the other genera studied. As mentioned above, this pharyngeal tooth development is more or less correlated with length of intestine, gill raker structure, and number of teeth. In all these characters *Loricaria* and *Hemiodontichthys* differ from *Sturisoma* and *Harttia* (all four Loricariine genera). The question may consequently be raised whether the Loricariinae may not be a biphyletic group, with *Loricaria* perhaps derived from a more primitive stock than *Harttia*.

Passing now to the digestive tract proper, the only character that the author would like to point out is the length of the intestine. In the Plecostominae the intestine is usually extremely long, lying in from ten to forty coils. In all the other subfamilies excepting a few higher forms of Neoplecostominae the intestine is much shorter, lying in from one to twelve loops or coils.

The position of the anus is another character of some value for subfamily classification. At one extreme it is located slightly behind the ventral bases; at the other it lies just ahead of the anal. In the Astroblepinae and Neoplecostominae the position is variable; in the Plecostominae it is always well back; and in the Loricariinae and Hypoptopomatinae it is relatively far forwards.

The last structure which will be taken up in connection with the alimentary system is the air bladder. The air bladder in the Loricariidae, as noted in Regan's definition of the family, has always been thought to be reduced to two small capsules lying underneath the supracleithral plates. The main posterior section, from which the two small lateral sections have presumably divided off, has never been recorded in the Loricariidae. It was, therefore, surprising to find what appears to be a large and functional posterior section in *Pogonopomoides* (text figs. 1 and 2). The anterior lateral sections of the air bladder of this fish were dissected and appeared to be just as in *Plecostomus* or *Ancistrus*. With the rather disturbing discovery of a posterior air bladder in *Pogonopomoides* (verified in two specimens), a search was made for this structure in other likely and available forms. In *Astroblepus, Neoplecostomus, Kronichthys, Plecostomus, Ancistrus,* and *Hemiancistrus* no trace of it was found.

The presence of a posterior air bladder would have been adequately disconcerting if it had been found in *Astroblepus* or *Neoplecostomus*. But to discover it in a form which the author considers to be at the top of the Neoplecostomine series presents him with a downright problem. In the first place the possibility that the presence of this structure in two specimens of *Pogonopomoides* is some sort of pathological fluke must be ruled out, for the scutes and skeleton of this form (and apparently in *Pogonopoma*) are heavier than in any other Loricariids known to the author, apparently in correlation with the presence of a posterior air bladder in this fish. There are three remaining possible explanations. The first is that this structure is not a true air bladder but rather an analogous structure developed especially in *Pogonopomoides*. This seems highly improbable. The other two possibilities are: (1) that *Pogonopomoides* is actually the most primitive Loricariid, and (2) that the posterior air bladder was formerly common or universal in the Loricariidae but has since dropped out in all genera except *Pogonopomoides*. Neither of these last two alternatives is particularly attractive. If, for the sake of argument, *Pogonopomoides* is hypothesized as the most primitive Loricariid genus, the following corollaries are more or less necessarily arrived at: that heavy scuting, a single tooth row, a pectoral count of I 6, an extremely elongate intestine, three

scutes between the supraoccipital and predorsal plate, and a dorsal spine locking mechanism are primitive characters. To the present author this would seem a strange accumulation to call "primitive". But the hypothesis that the posterior air bladder, apparently so well-developed in *Pogonopomoides*, should have disappeared in all other Loricariid genera is not much more convincing. There seems to be, in short, no very satisfactory explanation for the presence of this air bladder in *Pogonopomoides*.

SKULL AND RELATED BONES

The skull of Loricariids, of which various forms have already been figured by numerous authors,[9] is extremely well-developed, forming a strong and comparatively imperforate box above, and is in some respects simplified. The frontal foramen, so prominent in many other catfishes, is reduced to the size of a pin-head. There seems to be a tendency, particularly noticeable in *Hypoptopoma* (text fig. 5), for the small plates which usually cover the snout to become enlarged and form an indistinguishable part of the skull. On the other hand, in many forms

Fig. 5

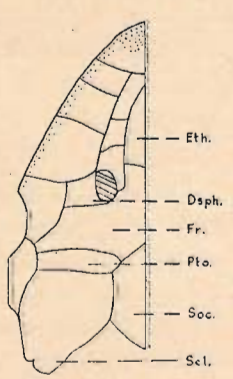


Fig. 5. *Hypoptopoma guentheri*, surface of left half of head, dorsal view. Unlabeled bones are apparently derived from dermal plates, but are indistinguishable externally from the true skull elements. Eth. = ethmoid. Dsph. = "dermatosphenoid". Fr. = frontal. Pto. = pterotic. Soc. = supraoccipital. Scl. = supracleithral plate.

the suborbital series and the nasal bone have either been lost or have formed an indistinguishable part of the small plates covering the snout. Perhaps, as noted earlier, the same thing has happened to the interopercle. In all forms the posterolateral part of the skull is covered by a single large plate — Regan calls it the *supracleithral* plate and Gregory the *supratemporal*. This plate, whatever its origin, seems to act as a protective shield covering the forward section of the air bladder.

Within the Loricariidae, there seem to be relatively few changes in the skull of obvious phylogenetic significance. Only three skull characters have been used for classification of the Loricariidae in the past, and of these only two seem to be of value.

Regan (1911, op. cit.) states that in the Astroblepinae the metapterygoid is small and does not reach the skull. This bone is rather convex forward and mesially. In all the remaining Loricariids the metapterygoid is a large bone connecting along its inner surface for the full length of the lateral ethmoid and sending an extension forwards which meets the palatine. (See text figs. 3 and 4.) This last bone, in fact, except in *Astroblepus* where it meets only the lateral ethmoid, is connected almost equally with the metapterygoid and the lateral ethmoid. It seems unprofitable to discuss here the significance of the loss of connection between the metapterygoid and the palatine in the Astroblepinae; the character could, however, be held to demonstrate advancedness rather than the primitiveness of this subfamily.

The second skull character, if it may be called that, of importance within the Loricariidae is the development of an evertible cushion, usually bearing hooks, in the interopercular region of certain of the Plecostominae. This character (see text figs. 3 and 4) forms so complicated a mechanism that it is hard to believe that it could have been developed twice. In the skeletons of two species of *Plecostomus*, the chief Plecostomine genus without this character, there is not even any tendency in this direction.

The third character previously used in Loricariid classification seems to be of little, if any, value. Regan (1911, op. cit., p. 577) has said of the Plecostominae and Hypoptopomatinae: "Supra-cleithral plate extending downwards, its inner surface attached to the outer edge of the cleithrum, but not forming a definite articulation with it." From this definition the Loricariinae, Neoplecostominae,

[9] For example: *Astroblepus* in Regan, 1911, op. cit., p. 566; *Plecostomus* in Gregory, 1933, *Trans. Amer. Phil. Soc.*, vol. 23, art. 2, p. 198; *Loricaria* in Koschkarcff, 1905, *Bull. Soc. Nat. Moscow* [not seen].

and Astroblepinae are distinguished as having the "supra-cleithral plate scarcely decurved, its lower surface with a transverse ridge, fitting a groove on the upper edge of the [cleithral] expansion external to the head of the bone." As to whether the supracleithral plate extends downwards or is scarcely decurved, this seems to depend largely upon the flatheadedness of the particular species. As to the type of articulation between the cleithral expansion and the supracleithral plate, this appears to differ more between *Loricaria steindachneri* and *L. cataphracta* than it does between subfamilies.

Besides the three skull characters previously used in Loricariid classification — those dealt with above — there seems to be one other that is worth noting. This has to do with the bones bordering the orbital rim above. In many Loricariids the eye is bordered above, in part at least, by the frontal. This seems to be true of the Loricariinae and most forms of Neoplecostominae. Apparently in most Plecostominae, however, the frontal does not reach the upper orbital rim, which is made up entirely of the pterotic and what Gregory (1933, loc. cit.) calls the dermatosphenoid. In *Hypoptopoma* (text fig. 5) none of these three bones — frontal, pterotic, and dermatosphenoid — reach the orbital rim, which here is entirely bordered by two small bones apparently derived from dermal platelets. This last condition is essentially that found in *Rhinelepis*[10] of the Neoplecostominae. In short, this skull character is more notable for its variation than for its phylogenetic indications.

VERTEBRAE AND RELATED STRUCTURES

Available vertebral counts, partly original and partly compiled from Regan (1904, op. cit.), are: Astroblepinae (1 form) 34, 17+17; Neoplecostominae (3 forms) 29-31, 13-15+14-18; Plecostominae (9 forms) 27--33, 13-15+13-18; Hypoptopomatinae (2 forms) 26-28, 11-13+14-15; Loricariinae (7 forms) 30-37, 10-13+18-25. In these counts, though there is overlapping, one thing stands out. The anal fin, indicated by the position of the first abdominal vertebra, has moved forwards from its position in the Astroblepinae to a new position in the Neoplecostominae and Plecostominae, and forwards again in the Hypoptopomatinae and Loricariinae. Also, the Loricariinae differs from the Hypoptopomatinae in the significantly greater number of caudal vertebrae.

The number of scutes seems to vary more or less directly with the number of vertebrae. The scute count for the different subfamilies is as follows: Neoplecostominae 22-32, Plecostominae 23-32, Hypoptopomatinae 21-26, and Loricariinae (25?) 28-37.

A vertebral character which has been used by Regan (1904 and 1911) in his primary division of the Loricariidae into two main groups is whether the anterior haemal spines are bifid or not. According to Regan these haemal spines are simple in the Plecostominae and Hypoptopomatinae and bifid in the Neoplecostominae, Loricariinae and Argiinae. This seems to be a true enough statement of the case in the forms studied in the present work except for what is here considered the Neoplecostominae. In this subfamily *Neoplecostomus* has all of the haemal spines in the anal region bifid, *Hemipsilichthys* has only the last two, and *Pogonopomoides* has none.

Certain other characters associated with the vertebrae seem to show variation here and there among the Loricariidae. For example some of the abdominal vertebrae usually bear ribs, but these are absent in *Pogonopomoides* and *Farlowella*. Also, the transverse process of the sixth vertebra is usually attached to this vertebra by an upper and lower ramus, which are separated by an interspace or foramen. This interspace is completely closed in *Neoplecostomus* and *Pogonopomoides*. Finally, the caudal vertebrae, which have high neural and haemal spines in the other subfamilies, have almost lost them in the Loricariinae; this of course is correlated with the depressed caudal peduncle of this subfamily.

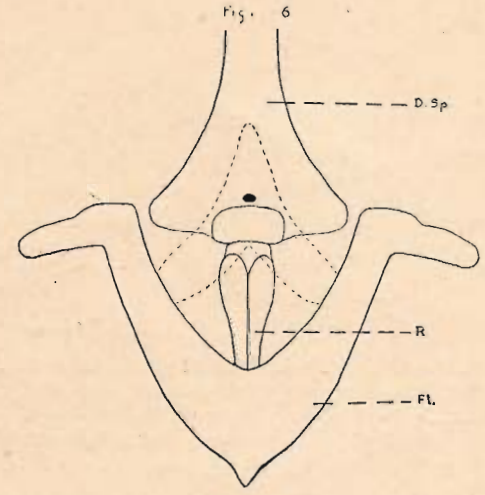
Another structure to be taken up in connection with the vertebrae may be called the dorsal spine locking mechanism. In the Plecostominae this mechanism functions in such a way that the dorsal spine, once erected, cannot be depressed until the V-shaped predorsal plate has been raised. This locking system is extremely difficult to explain or to figure, although an attempt has been made

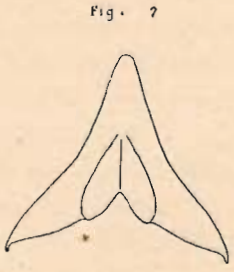
[10] There are, as a matter of fact, other superficial resemblances between *Rhinelepis* and *Hypoptopoma*.

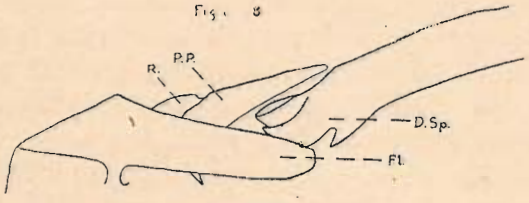
to do the latter (text figs. 6 to 9). Complicated as it appears, it is of exactly the same type as that found in at least the armored Doradids (see Eigenmann, 1925, *Trans. Amer. Phil. Soc.*, n. s., vol. 22, p. 290). For this reason this mechanism cannot be considered a unique specialization of one section of the Loricariidae, though it may well have been developed there separately.

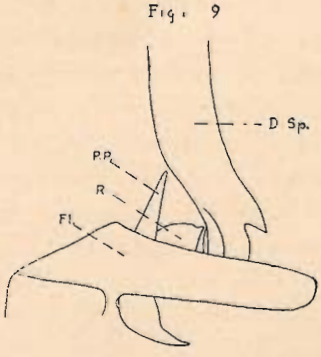
This complicated dorsal spine locking mechanism seems to be totally absent in the Loricariinae, Hypoptopomatinae, Astroblepinae, presumably in the Lithogeninae, and absent in the lower Neoplecostominae. Whether the lack of this structure in these subfamilies is because of loss or because they never had it is not clear.

There is, however, a feature more or less connected with the dorsal spine which does appear within limits to give phylogenetic indications. This is the number of azygous scutes between the supraoccipital and the predorsal plate. In the Plecostominae, Hypoptopomatinae, and most Loricariinae there are three (occasionally four), and these three scutes are always more or less symmetrical. In the lower forms of Neoplecostominae, however, the predorsal scutes are neither symmetrical nor in fixed number, varying from four to seven or eight. It is the author's distinct impression that in these lower forms of Neoplecostominae the predorsal scute pattern has not been set, whereas in the Plecostominae, Hypoptopomatinae, and Loricariinae it has. In short, the author feels that the lack of a definite number of predorsal scutes is a primitive character; the alternative, that the predorsal scute arrangement has been set and later lost, does not seem probable.









Figs. 6 to 9. Diagrams of dorsal spine locking mechanism in *Pogonopomoides parahybae*. Fig. 6. Dorsal view with dorsal spine depressed. Predorsal plate drawn in with broken lines. Fig. 7. Predorsal plate, ventral view, to show groove which fits over the first interneural spine. Fig. 8. Lateral and slightly superior view of mechanism, with dorsal spine depressed. Fig. 9. Same view with dorsal spine erect. D. Sp. = dorsal spine. R. = central ridge of first interneural. Fl. = superficial flange of first interneural. P. P. = predorsal plate.

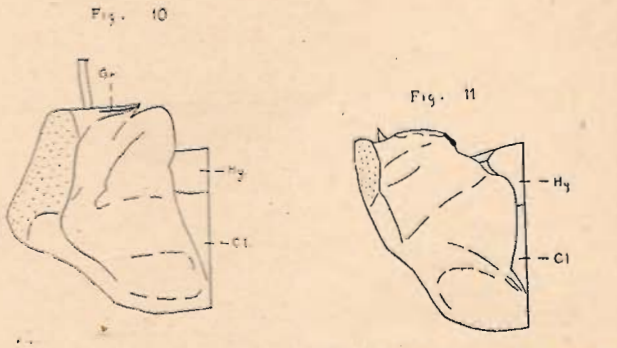
In life the upper tip of the predorsal plate is firmly attached to the dorsal spine, and the latter cannot be depressed without also depressing the former. But the first interneural forms a central bulging ridge running upwards and backwards over which the groove of the predorsal plate fits tightly. Consequently the predorsal plate, and with it the dorsal spine, cannot be depressed until the predorsal plate has first been lifted directly upwards. Backward pressure on the dorsal spine simply causes the predorsal plate to clamp the ridge of the first interneural more tightly than ever.

PECTORAL GIRDLE

The pectoral arches of the two sides of the body in the Neoplecostominae, Plecostominae, Loricariinae, and Hypoptopomatinae interlock on the midventral line, forming a firm transverse bridge across the chest. In sharp contrast to this, the Astroblepinae are said by Regan (1911, op. cit., p. 577) to have the "cleithra running somewhat forward to their symphasis; hypocoracoids tapering forward below, not interlocking." The pectoral girdle of the Astroblepinae thus appears to be similar to that of such a family as the Pimelodidae, while the pectoral arch of the Neoplecostominae, etc., seems to bear a closer resemblance to that of the armored Doradidae. It is difficult to say whether the Astroblepine or Neoplecostomine type of pectoral girdle is the more primitive.

Within the Neoplecostominae, Plecostominae, Loricariinae, and Hypoptopomatinae, the pectoral girdle shows comparatively little variation. In general it conforms rather closely to the pattern of *Loricaria cataphracta* (text fig. 10). The cleithrum, as in this species, sends out a heavy, exposed backward flange over the base of the pectoral spine, restricting the spine rather rigidly to a backwards and forwards plane of movement. In *Neoplecostomus* and closely related genera (and in *Loricaria steindachneri,* see below), however, this cleithral flange is considerably reduced, and the pectoral spine can be moved upwards and downwards to a certain extent as well as backwards and forwards.

Regan (1911) has used the connection of the pectoral girdle with the skull as a character for differentiating subfamilies (see above). He states, as noted there, that in the Loricariinae, Neoplecostominae, and Astroblepinae the lower surface of the supracleithral plate has "a transverse ridge fitting a groove on the upper edge of the [cleithral] expansion external to the head of the bone." The present author understands this to mean the groove shown in text fig. 10. However, this groove is well-developed, though perhaps less so, in *Hypoptopoma, Plecostomus,* and *Ancistrus,* which belong to subfamilies where according to Regan the supracleithrum does not form a definite articulation with the cleithrum. The present author, in fact, has found only one significant variation in the cleithral-skull connection pattern. This is within the genus *Loricaria.* Whereas *L. cataphracta* shows the typical Loricariid cleithrum, which comes to a point where it extends farthest dorsally and with a groove lateral to this point, the cleithrum of *L. steindachneri* (text fig. 11) has no dorsal point but rather an articulatory ridge, and a socket medial to this ridge. The cleithrum of *L. steindachneri* seems to have a rather different method of articulating with the skull than any of the other forms of Loricariidae from which skeletons have been made. [11]



Figs. 10 and 11. Right half of pectoral girdle, drawn from in front and above. Exposed parts stippled. Fig. 10. *Loricaria cataphracta.* Fig. 11. *Loricaria steindachneri.* Gr. = groove in dorsal edge of cleithrum. Cl. = cleithrum. Hy. = hypocoracoid.

PELVIC GIRDLE

The shape of the pelvic girdle in the various forms studied, even in two related species such as *Loricaria steindachneri* and *L. cataphracta,* varies so greatly that it would seem to be of little use in Loricariid classification, at least until a more thorough study has been made. (Some of the types of variation encountered may be seen in Shelden, 1937, *Ann. New York Acad. Sci.,* vol. 37, figs. 22, 24, 25, & 55.)

What Shelden names the *lateropterygium* and what Regan (1904) called the "anterior rudimentary ray of ventral", which he thought to have become "internal and directed forwards", was, however, one of the characters used in Regan's 1904 subfamily diagnosis. The present author believes, however,

[11] Though it is outside the scope of the subject at hand, it seems worth mentioning that in *Loricaria steindachneri* the whole pectoral arch and the nature of the base of the dorsal spine are very different from the corresponding structures in *L. cataphracta.* These characters may well form a more valid basis for the splitting of the genus *Loricaria* (sensu latu) than any that has hitherto been used.

that the lateropterygium is not a good classificatory character, and that its presence, size, and shape depend more or less on the extent of the plating of the sides and abdomen. Apparently Regan may later have come to the same conclusion, for this character does not appear in his 1911 classification.

The lateropterygium in *Plecostomus, Ancistrus,* and *Pogonopomoides* and, according to Shelden, in *Pterygoplichthys* is well-developed, spine-like, and equal to 1/4 to 1/2 the length of the ventral spine. In *Kronichthys, Hemipsilichthys,* and *Harttia* the lateropterygium is shorter but still spine-like. The above are all forms in which the lateral plating is more or less complete and the abdominal plating either absent or at least not forming a continuous bony shield. In *Neoplecostomus* — another form with lateral plating and the abdominal plating not extending to the area between the ventral bases — Regan (1904) calls the "anterior rudimentary ray of ventral internal, plate-like." This is hardly the case. The lateropterygium is short and somewhat flattened, but still more spine-like than plate-like.

In *Hypoptopoma, Parotocinclus,* and *Loricaria steindachneri,* in which the abdominal plating forms a bony shield, the lateropterygium is reduced, but spine-like. *L. steindachneri* and *Harttia* make two forms in the Loricariinae, where according to Regan (1904) there is no lateropterygium, in which this structure is present. In two other forms of the Loricariinae, *Loricaria cataphracta* and, according to Shelden, *Farlowella,* this process is indeed totally absent.

In *Astroblepus* the lateropterygium "is represented by a small internal plate, elongate oval in form," thus differing from the other Loricariids. However, it is here suggested that this change of form is simply an adaptation to the unscuted condition of *Astroblepus,* for it would seem that a spine-like lateropterygium of the usual Loricariid type lying directly under the naked skin of *Astroblepus* would be all too likely to simply puncture this skin under the slightest stress. [12]

[12] This is all the more true as these fishes constantly move the whole pelvic girdle forwards and backwards in climbing (see R. D. O. Johnson, 1912, *Ann. New York Acad. Sci.,* vol. 22, p. 329).

FIN COUNTS

The number of fin rays in all the fins shows little variation throughout the whole of the Loricariidae. The maximum range of the ventrals seems to be I 3-I 5, of the pectorals I 5-I 12, of the caudal 10-16, of the anal I 3-I 6, and of the dorsal I 6-I 13. Within these slight ranges, there is at least one count, that of the pectoral, which is of importance for subfamily classification.

The pectoral count for the Astroblepinae varies from I 9 to I 12, and in the Lithogeninae it is given as I 8. This is a rather normal catfish pectoral count. In all the other Loricariidae, however, the pectoral count has become reduced and stereotyped at I 6, except in some of the Hypoptopomatinae and in some species of *Farlowella* (Loricariinae) where it is I 5. The significance of these counts I have dealt with earlier.

The ventral fins also seem to show a different pattern stabilization in the Astroblepinae and Lithogeninae than in the other Loricariids. In these two subfamilies the ventral count is I 4 or I 3, while in all the other Loricariidae, except once again the aberrant *Farlowella* which sometimes has I 4, the ventral count is I 5.

The anal, varying only between I 3 and I 6, seems to be of significance here and there among genera and groups of genera. The Neoplecostominae seems to have a fairly constant count of I 5, while *Plecostomus* is constant at I 4. The highest anal count of I 6 seems to be characteristic of the Astroblepinae, and this count is never found in the Hypoptopomatinae, Loricariinae, and Plecostominae.

The number of dorsal fin rays seems to have a basic count of I 7, but in *Astroblepus* and *Farlowella* it is usually I 6, while in various other genera — all in the Plecostominae except *Delturus* — the number of dorsal rays has increased. In fact, in some genera of Plecostominae there seems to be no basic number of dorsal rays.

The caudal fin also has a principal ray count which is only constant within limits. *Astroblepus* is said by Schultz (1944, *Proc. U. S. Nat. Mus.,* vol. 94, p. 182) to have the ray count usually 11; in the Loricariinae the usual number seems to be 12 or 14; and in the Hypoptopomatinae, the Neoplecostominae,

and the Plecostominae the normal caudal ray count seems to be 16. Counts of 13 and 15 in specimens of various Loricariidae do not seem to be rare, however.

DISCUSSION AND DEFINITION OF INDIVIDUAL SUBFAMILIES

By way of bringing together the different Loricariid variations which have already been dealt with it seems wise to take up the individual subfamilies separately.

ASTROBLEPINAE — The Astroblepinae (Argiinae of Regan), containing one genus and about 27 species, is limited to the Andean region, where it is one of the genera found highest in the mountain torrents.

In external appearance *Astroblepus* bears a closer resemblance to *Pygidium* than to *Plecostomus* or *Loricaria*. This similarity is not only superficial but pertains also to certain internal structures such as the air bladder, as has been pointed out in the letter from Mr. Cecil Miles accompanying the two specimens of *Astroblepus* sent by him. Among the superficial resemblances between this genus and *Pygidium*, and separating it from *Plecostomus*, may be mentioned the following: body naked, top of head covered with muscle, eye embedded in muscle and without a bony orbital rim, teeth not in a single row, and anal set far posteriorly. Furthermore, one of the two specimens of *Astroblepus* sent by Mr. Miles has the barbel at one corner of the mouth double. Just how many of the above resemblances are due to genetic relationship and how many are the effect of living in a similar environment is impossible for the author to say at this point, and is in any case beyond the scope of the present paper. It is perhaps significant that *Astroblepus* differs strongly from *Pygidium* in the forward position of the ventral and dorsal fins. In fact, in these points, as well as in all the superficial characters mentioned above, *Astroblepus* bears a closer resemblance to some of the Pimelodids, for example *Chasmocranus*, than to *Pygidium*.

In the sucker-like mouth, in the asperous fin spines, and in most internal structures, however, *Astroblepus* is a Loricariid, falling within the definition of the family given by Regan (quoted above). That author (1904; see also 1929, *Encyclopaedia Britannica*, article on "Fishes") believed that the Astroblepinae were "degraded or ultraspecialized forms" of Loricariidae, the loss of scutes, etc., being adaptations to a torrential environment. The present author feels that many of the peculiarities of the subfamily, including the absence of scutes, may have been adaptations to this environment. He would not care to judge whether the lack of body armor in this subfamily is primitive or secondary.[13] The scutes being absent, it is only natural that many of the internal structures of *Astroblepus* would be adjusted, secondarily or not, to this absence. Perhaps the peculiarities of the pectoral girdle, of the lateropterygium, and even of the metapterygoid are among such adjustments. The author feels that whatever adaptations may have taken place in correlation with a torrential environment, the Astroblepine stock separated from that of other Loricariids before the rest of the family evolved to its present status. The basis of this belief lies chiefly in the high pectoral count of *Astroblepus;* this character has been discussed at length earlier in the paper.

Before passing to a definition of the subfamily, there is one physiological specialization in *Astroblepus* worth mentioning. That is that, whereas other Loricariids take in water at the mouth and expel it through the gills (see S. L. Hora, 1932, *Proc. Zool. Soc. London* for 1932, pt. 1, p. 206), *Astroblepus* is said (P. D. O. Johnson, 1912, *Ann. New York Acad. Sci.*, vol. 22, p. 330) to take water in through an orifice at the top of the gill opening. This orifice is well-marked in the specimens of *Astroblepus* at hand, but there seems to be nothing very peculiar about the gill chamber into which it leads.

The Astroblepinae may be defined as follows:

Teeth simple or bifid, not aligned in a single well-defined row in either jaw. Gill rakers absent or rudimentary. Pharyngeals with teeth on entire surfaces, those above conical, those below rather pavement-like. Intestine short and broad, with a single fold, preceded by a well-developed stomach. Liver a large organ filling the right side of the abdomen. Posterior division of air bladder absent. Me-

[13] It is perhaps worth mentioning in this respect that the genera which the author considers to be the nearest relatives of *Astroblepus* — *Lithogenes, Neoplecostomus, Upsilodus* — do not have the armor as well developed as in most forms of Plecostominae, Loricariinae, and Hypoptopomatinae. "Parallel evolution" does not seem to be a good explanation for this fact.

tapterygoid small, not reaching skull and not articulating with palatine. Whole of head covered with muscle; eye inserted in muscle. Interopercular area spineless. Vertebrae (one form) 17+17. Anterior haemal spines bifid. Cleithra tapering forwards to the midline; hypocoracoids not interlocking. Lateropterygium expanding into a roundish plate above. Scutes absent. Anal originating well behind tip of last, depressed dorsal ray. Anus variable (forward of and distinct from genital opening in specimens at hand). Caudal peduncle compressed. Pectoral count I 9-I 12; ventral I 3-I 4; anal I 4-I 6; caudal usually 11.

LITHOGENINAE — This subfamily is erected here on the basis of the description and plate of a single specimen collected by Eigenmann in British Guiana. The specimen seems, from the external description and plate, to be about intermediate between *Astroblepus* and *Neoplecostomus*. From a distributional standpoint it is interesting to note that *Astroblepus* is not known from east of the Andes, while at least the major center of distribution of the Neoplecostominae is in Southeastern Brazil. [14]

The subfamily, so far as is possible from Eigenmann's description and plate (1912, *Mem. Carnegie Mus.*, vol. 5, p. 228, pl. 26), may be characterized as follows:

Teeth bifid, reduced in number, in a single row in either jaw. Lower tooth row followed by a group of enlarged papillae. Interopercular area spineless, not evertible. Body with poorly developed scutes posteriorly. Anal originating well behind tip of last, depressed dorsal ray. Caudal peduncle roundish. Pectoral count I 8; ventral I 4.

NEOPLECOSTOMINAE — The Neoplecostominae forms the subject of the next paper and consequently will not be dealt with at length here. Suffice it to say that the present author's conception of the group is quite different from that held by Regan, who erected the subfamily (1904, op. cit.). Several genera described since 1904 have made such a reevaluation necessary.

The Neoplecostominae, as here understood, contains a rather heterogeneous group of genera of a stock from which the Plecostominae, Hypoptopomatinae, and Loricariinae are thought to have arisen. The Hypoptopomatinae and Loricariinae are considered to be specialized offshoots, while the Plecostominae is believed to be a more or less direct continuation of the Neoplecostomine stock. The relationship of the Hypoptopomatinae, Loricariinae and Plecostominae to the Neoplecostominae was discussed earlier. The author is quite willing to admit that future knowledge may show a different dividing line between the Plecostominae and Neoplecostominae to be more advantageous. But for the two subfamilies to be combined because there is no clear separation between them would seem to clarify no concept of Loricariid classification.

The Neoplecostominae appears to have a center of distribution in Southeastern Brazil, as noted above. The lower forms of Neoplecostominae (*Neoplecostomus* through *Kronichthys*) are small, poorly known fishes inhabiting the mountain streams. Perhaps because of this they have been little collected, and most of the species are known from but a few specimens. It is not unlikely that future collecting in similar habitats in the Guiana highlands will show the Neoplecostominae to be well-represented there. They do not, however, seem to be present in the Andean region.

The genera here considered to belong to the Neoplecostominae are: *Neoplecostomus, Upsilodus, Hemipsilichthys, Pareiorhaphis, Pareiorhina* §, *Kronichthys, Corymbophanes, Delturus, Rhinelepis, Canthopomus, Pogonopoma,* and *Pogonopomoides* §. This assemblage does not fall into any clear-cut definition. Such as it is, the subfamily may be defined as follows:

Teeth simple or bifid, in a single row in each jaw. "Gill rakers" resembling the gill filaments in structure. Lower pharyngeals with villiform teeth on entire surface or along the inner edges only; fourth upper pharyngeals with villiform teeth or apparently toothless. Intestine comparatively short, usually in fewer than 12 loops. Posterior division of air bladder usually absent, but present and well-developed in *Pogonopomoides*. Metapterygoid large, connecting with the lateral ethmoid above and articulating with the palatine forwards. Interopercular area spineless, not evertible. Vertebrae 29-31, 13-15+14-18. Anterior haemal spines bifid or simple. Cleithra and hypocoracoids interlocking on the midventral line, not exposed on chest. Lateropterygium small, spine-like or slightly flattened. Scutes present on sides and upper part of body, leaving a naked region or an area covered by small platelets posteroventral to the supracleithral plate. Three to seven scutes between the supraoccipital and the predorsal plate, which is well-developed, reduced, or absent.

[14] Outside of Southeastern Brazil there are only two records for *Hemipsilichthys* from the Rio Negro drainage and a somewhat dubious one for *Neoplecostomus* from French Guiana, while *Corymbophanes andersoni* was described from a single specimen from British Guiana.

§ New genera to be described in the following article.

Anal originating slightly behind or under the last, depressed dorsal ray. Position of anus variable. Caudal peduncle compressed or rounded. Pectoral count I 6; ventral I 5; anal I 5 (sometimes I 6 in *Neoplecostomus*, said to be I 4 in *Corymbophanes andersoni*); caudal usually 16.

PLECOSTOMINAE — The Plecostominae is the largest Loricariid subfamily, containing some 21 recognized genera and 225 species. The genera may be divided into two groups, one without an evertible interopercular area and one with this area evertible and usually bearing hooks. These two groups, though apparently phylogenetic entities, imperceptibly grade into each other. It is possible, although it seems improbable, that the evertible interopercular area has been developed more than once. *Plecostomus*, the largest genus without this specialization and, indeed, the largest in the subfamily, seems to be divided into two major sections, one with a center of distribution in the Amazon region and the other entirely limited to eastern South America (from British Guiana to Uruguay). The great majority of the Plecostomine genera have the interopercular region evertible. These genera are most abundantly represented in the Amazon basin and the Andean region, and are quite rare in Southeastern Brazil. In the present work the author has had all too few forms of this spinycheeked group available for study. It is for this reason in part that in the key which concludes this paper the Plecostominae is keyed out twice.

The genera and species of the Plecostominae are very difficult to distinguish. The author is of the opinion that the difficulty is in part a function of pure number of forms and in part because the Plecostominae are still rapidly evolving. The species of all the larger Plecostomine genera are badly in need of revision, but this specific revision can only be undertaken profitably on the basis of more extensive and intensive collections than yet exist. Preliminary material for a revision of the Southeastern Brazilian species of *Plecostomus* forms the third article included with this paper.

The subfamily may be defined as follows:

Teeth bifid or spoon-shaped, in a single series in each jaw. "Gill rakers" resembling the gill filaments in structure. Pharyngeals toothless. Intestine usually extremely long, often in 25 or more coils. Posterior division of air bladder absent. Metapterygoid large, articulating both with the skull and with the palatine. Interopercular area normal or with an evertible cushion which usually bears hooks. Vertebrae (in nine forms) 27-33, 13-15+13-18. Anterior haemal spines bifid. Cleithra and hypocoracoids interlocking on the midventral line, not exposed on surface of chest. Lateropterygium spine-like, comparatively large. Scutes usually present on sides and back. Supracleithral plate usually followed posteroventrally by the exposed cleithrum. Normally three symmetrical scutes on the middorsal line between the supraoccipital and the predorsal plate; predorsal plate well-developed, V-shaped, forming part of a mechanism whereby the dorsal spine may be locked erect. Anal originating somewhere under last, depressed dorsal ray. Anus situated close to the anal origin. Caudal peduncle compressed. Pectoral count I 6; ventral I 5; anal I 4-I 5; caudal usually 16.

HYPOPTOPOMATINAE — The Hypoptopomatinae consists of about six genera and 36 recognized species. Of these genera *Hypoptopoma* is the most distinctive and is represented in the Orinoco, Amazon, and Paraguay basins. Of the other genera all except *Otocinclus* are confined to Southeastern Brazil, where they seem to occur chiefly in smaller streams. All of the species of this family are small, less than six inches in length. With the possible exception of *Hypoptopoma*, the generic and specific confusion in this subfamily is superb. The Museu Nacional, however, possesses good collections of these fishes, and it is hoped that they will eventually be worked up.

The following definition of the Hypoptopomatinae is based chiefly on two forms and is therefore rather inadequately substantiated:

Teeth bifid, in a single series in each jaw. "Gill rakers" resembling the gill filaments in structure. Pharyngeal teeth minute, villiform. Intestine comparatively short, in few coils. Posterior division of air bladder absent. Metapterygoid large, articulating both with the skull and with the palatine. Interopercular area not evertible. Vertebrae 26-28, 11-13+14-15. Haemal spines all simple. Cleithra and hypocoracoids interlocking on the midventral line, exposed where they cross the chest. Lateropterygium small, rod-like. Body armor unusually well-developed, enlarged plates usually encasing the chest and snout as well as the rest of the body. Supracleithral plate followed directly by the exposed cleithrum posteroventrally. Normally three scutes between supraoccipital and predorsal plate, which is small or absent. Anal originating somewhere under last, depressed dorsal ray. Anus separated from the anal by a median plate and one or more pairs of lateral plates which meet along the midventral line. Caudal peduncle compressed or rounded. Pectoral count I 5 or I 6; ventral I 5; anal I 5; and caudal 16.

LORICARIINAE — In external appearance, at least, the Loricariinae is the most specialized Loricariid subfamily. The tendency throughout the whole family for the head and body to be flattened is carried towards its ultimate conclusion in this subfamily in that the caudal peduncle has also become flat. There seems to be another tendency in this subfamily as well: that is towards elongation. Not only have the vertebrae been increased in number, but the snout in some genera has developed a forward projection, while some species have developed long trailing filaments from the fin rays. *Farlowella*, which may be regarded as the ultimate development along this line, looks like a stick, and superficially resembles a pipefish more closely than it does a catfish.

At the other end of the series *Harttia* comes fairly close to being intermediate between *Sturisoma* and, for example, *Corymbophanes* of the Neoplecostominae.

The Loricariinae shows some indications, as pointed out earlier, of being biphyletic. The subfamily can, at least, be split into two apparently distinct groups on the basis of gill raker structure, pharyngeal teeth development, number of teeth, and possibly the presence or absence of an orbital notch. It consists of some ten genera and 139 species, of which 85 belong to the genus *Loricaria* (sensu latu). But as has been pointed out earlier in the paper, it seems probable that *Loricaria* will have to be split up.

If the Loricariinae has any center of distribution, it is probably the Amazon region, but the subfamily is found throughout the South American lowlands from La Plata to Panama.

The subfamily may be defined as follows:

Teeth bifid, in a single series in each jaw, in some species rudimentary. Gill rakers either little developed, normal, or resembling the gill filaments in structure. Lower and fourth upper pharyngeals either with villiform or peculiarly shaped, molariform teeth. Intestine comparatively short, in few coils. Posterior section of air bladder absent. Metapterygoid large, articulating both with the skull and with the palatine. Interopercular area not evertible. Vertebrae (seven forms) 30-37, 10-13+18-25. Haemal spines bifid. Cleithra and hypocoracoids interlocking along the midventral line, not exposed on surface of chest. Body armored above and on sides, usually also on chest and abdomen. Supracleithral plate followed directly posteroventrally by the exposed cleithrum. Usually three scutes between the supraoccipital and predorsal plate, but more in elongate genera. Predorsal plate small or absent. Anal usually originating somewhere under last, depressed dorsal ray. Anus separated from the anal by an azygous plate and one or more pairs of lateral plates which meet along the midventral line. Caudal peduncle strongly depressed. Pectoral count I 6 (sometimes I 5 in *Farlowella*); ventral I 5 (sometimes I 4 in *Farlowella*); caudal usually 12 or 14.

CONCLUSION AND KEY TO SUBFAMILIES BASED ON EXTERNAL CHARACTERS

The foregoing paper has dealt at some length with all available characters, superficial or otherwise, which seemed to throw light on the phylogeny of the fishes within the family Loricariidae. A reclassification of the subfamilies has been developed from this study.

The question of the origin of the family remains for the future. The author would care to make no suggestion as to possible derivations here, but would like to suggest one warning. References have been made above to the resemblance between certain Loricariid structures and those of the armored Doradids. This is largely because the osteology of the armored Doradids has been more thoroughly worked out (by Eigenmann, 1925, op. cit.) than that of other catfish groups which the Loricariids might resemble. Further, it is well to remember that resemblances between the Loricariids and Doradids may be due in part at least to "parallel evolution" in the two different armored groups.

The author is well aware that the lines of structural development followed out above are of little help to the ichthyologist who simply wants a subfamily identification for some Loricariid specimen. To partly remedy this situation the paper concludes with a key to subfamilies which expresses in external characters the author's conception of phylogenetic subfamily arrangement. The only notes that need be made concerning this key are that, for several reasons, the Plecostominae has been keyed out twice and that the Loricariinae and Hypoptopomatinae have been split off from the Neoplecostominae together whereas they might equally well have been split off separately.

1a. Pectoral rays I 8 to I 12; anal placed far back, well behind tip of last, depressed dorsal ray; body largely or entirely naked.

2a. Pectoral rays I 9 to I 12; teeth not aligned as a single, well-defined row in each jaw; body entirely naked; caudal lunate, the outer rays the longest.

Astroblepinae

2b. Pectoral rays I 8; teeth in a single series in each jaw; body with a few rudimentary scutes; caudal bilobed, the two outermost rays not the longest; a series of enlarged papillae on lower lip just behind the mandibular teeth.

Lithogeninae

1b. Pectoral rays I 6, sometimes I 5; anal placed nearly under or ahead of tip of last, depressed dorsal ray; sides of body usually completely covered by bony scutes.

3a. Anus often separated from the anal origin by a single, azygous, preanal plate, but never by a pair of ventrolateral plates which meet along the midline just behind the anus; belly never enclosed and shielded by a series of smooth, interlocking plates; lower transverse portion of pectoral girdle never exposed as a bony bridge across front of chest; caudal peduncle roundish or compressed.

4a. Interopercular area normally developed, never specialized as a group of fused platelets which are automatically forced outwards and forwards when the outer border of the opercle is raised.

5a. Anal rays usually I 5 (said to be I 4 in *Corymbophanes andersoni*, sometimes I 6 in *Neoplecostomus*); supracleithral (supratemporal) plate bordered posteroventrally at least in part by a naked area or by a few to several small platelets.

Neoplecostominae

5b. Anal rays I 4; supracleithral plate bordered posteroventrally by the exposed cleithrum; cheeks never with bristles; predorsal plate V-shaped, closely appressed to the dorsal spine, with the prongs of the V extending anteroventrally (text figs. 6 to 9); normally three rather symmetrical, azygous scutes between supraoccipital and predorsal plate.

Plecostominae in part (*Plecostomus* and related genera)

4. Platelets in interopercular region fused, usually bearing hooks, and articulating with the opercle in such a way that raising of the outer opercular border forces the interopercular area outwards and forwards (text fig. 4).

Plecostominae in part (*Ancistrus* and related genera)

3b. At least one pair of ventrolateral plates meeting along the midline between anus and anal origin.

6a. Lower transverse portion of pectoral girdle exposed as a bony bridge across front of chest; caudal peduncle compressed or rounded.

Hypoptopomatinae

6b. Lower transverse portion of pectoral girdle not exposed, this area usually covered with small platelets; caudal peduncle strongly depressed.

Loricariinae

II. A SYNOPSIS OF THE GENERA OF NEOPLECOSTOMINAE

The limits and definition of the Neoplecostominae used in the present synopsis are those set up in the previous section. The emphasis of this paper is on genera, but species are treated where Museu Nacional material warrants doing so.

In addition to *Neoplecostomus*, many of the obscure genera that have hitherto been scattered here and there among the Plecostominae belong, in the author's opinion, to the Neoplecostominae. These genera are here collated; their interrelationships are studied; and the species wrongly attributed to them are weeded out. It is the author's hope that with these genera arranged in some sort of system the classification of both the Neoplecostomine and of the remaining Plecostomine genera will be more intelligible.

Unfortunately, at least three loose ends are left by this paper. First, the material at hand is not sufficient to judge concerning the validity of a number of Neoplecostomine species. The general principle followed in such cases is to recognize as provisionally valid all species which cannot be, or have not been, shown synonyms by direct comparison of specimens. Second, quite a number of species have been wrongly assigned in the original descriptions to genera dealt with here; a few of these species are left without generic allocation. Third, certain species of Plecostominae, particularly in the genera *Plecostomus* and *Hemiancistrus*, probably belong to the Neoplecostominae but are not taken up here. These loose ends are inherent in the lack of material and in the faultiness of some of the descriptions. It is hoped that they will not give rise to greater problems than those which the present paper attempts to solve.

The subfamily Neoplecostominae was first erected by Regan (1904, *Trans. Zool. Soc. London*, vol. 17, pt. 3, p. 201) for the single genus *Neoplecostomus*. The relationship between *Neoplecostomus* and the genera surrounding *Hemipsilichthys* seems to have been realized, though left unstated, by both Steindachner (e. g., 1911, *Ann. K. K. Naturhist. Hofmus.*, vol. 24, p. 430) and A. de Miranda Ribeiro (e. g., 1918, *Rev. Soc. Bras. Sci.*, n.° 2, pp. 104-105). Eigenmann (1912, *Mem. Carnegie Mus.*, vol. 5, p. 229) makes an equally vague inference as to the relationship between *Neoplecostomus* and *Lithogenes*. However, for formal purposes *Neoplecostomus* has continued to retain to the present day its isolated position as the single representative of a separate subfamily of Loricariidae.

Since Regan's monograph (1904, op. cit.) a number of genera have been described, bridging over the gap between *Neoplecostomus* (or the Neoplecostominae) and *Plecostomus* (or the Plecostominae). In fact, the border line between the two subfamilies might now be drawn with almost equal justification at any one of several intergeneric gaps, as has been pointed out above (see p.).

The Neoplecostominae is here considered to be a rather broadly delimited subfamily of a stock from which three different, rather specialized lines are thought to have arisen, namely the Plecostominae, Hypoptopomatinae, and Loricariinae. If this interpretation is accepted, a rather interesting point is brought out. Taking the author's catalogue of catfishes (1945, *Bol. Mus. Nac., Zool.* n.° 33) as an arbitrary basis, the average number of species per genus in the Plecostominae is found to be over ten, in the Hypoptopomatinae six, and in the Loricariinae over thirteen, while in the Neoplecostominae it is slightly over two. Again, about 20% of the Plecostomine genera contain more than ten species, 16% of the Hypoptopomatine, and 30% of the Loricariine, but none of the Neoplecostomine genera contain over six species. [15] This seems to be no artifact of classification, for the genera of Neoplecostominae appear to differ from one another at least as much as the genera of other Loricariid subfamilies.

Within the Neoplecostominae, it is not easy to state on the basis of any one character which genera belong to a more primitive and which to a more advanced stock. The incomplete scuting of *Upsilodus*, for example, may be primitive, or it may be a secondary reduction. The simple teeth, the absence of a dorsal spine locking mechanism, and the more or less free movement of the pectoral spine in some genera are all open to the same alternate interpretations. [16] Nevertheless, though hardly any one character can be seized upon as a demonstration that one genus of Neoplecostominae, or for that matter the Neoplecostominae as a whole, is primitive, the author has no hesitation in placing *Neoplecostomus* towards the base of the subfamily and *Pogonopoma* towards the end. *Neoplecostomus* (and the Neoplecostominae) shows an accumulation of characters which, in comparison with *Plecostomus*, *Loricaria*, or *Hypoptopoma*, look too suspiciously primitive to be all explained away as secondary simplification.

With the above discussion in mind it is hoped that the characters used in the following key will not be seized upon in themselves as indicating "primitiveness" or "advancedness". They may, or they may not.

KEY TO THE GENERA OF NEOPLECOSTOMINAE

1a. Lateral scutes 27-32; predorsal plate minute or absent, never closely attached to the dorsal spine; four or more scutes, exclusive of the predorsal scute, on the midline between supraoccipital and dorsal origin.

2a. Tooth row of lower jaw followed by one to several series of distinct, enlarged papillae; abdomen with a rather regular six-sided shield of small, prickly platelets, bordered on all sides by a naked area. I. *Neoplecostomus*

2b. Tooth row of lower jaw not followed by one or more distinct series of enlarged papillae; abdomen without an isolated, regularly six-sided shield of platelets.

[15] The Astroblepinae, however, which the author considers to belong to a stock even more primitive than the Neoplecostominae, consists of a single genus with about 27 species (see Schultz, 1944, *Proc. U. S. Nat. Mus.*, vol. 94, p. 278). The classification of this subfamily is hardly comparable to that of other Loricariids, for, with the loss of scutes, most of the characters used to separate genera in the remainder of the Loricariidae have disappeared. Also, *Astroblepus* is extremely specialized in its own way, and is one of the few genera found in the torrential streams of the Andes.

[16] The dorsal and pectoral spine articulating arrangements of, for example, *Pogonopoma*, at first sight so complex, are almost exactly of the type found in the Doradidae (see Eigenmann, 1924, *Trans. Amer. Phil. Soc.*, n. s., vol. 22, pt. 5) and several other catfish groups.

3a. Each tooth with two, approximately equal lobes; lateral scutes failing to meet anywhere along the middorsal line between the dorsal and the adipose, leaving a naked middorsal band nearly equal in width to an eye diameter.
II. *Upsilodus*

3b. Each tooth either simple or with a single, small, lateral lobe; lateral scutes meeting along middorsal line at least for part of the distance between dorsal and adipose.

4a. Head to end of supraoccipital contained 3.4 or fewer times in standard length, broad and flattened, the distance from the lower rim of eye to outer border of cheek about equal to or greater than interorbital width.

5a. Adipose fin present; caudal peduncle comparatively short, rounded or ovate, its depth contained 3.2 or fewer times in its length.

6a. Abdomen entirely naked; adults with straight bristles on cheek, which become greatly elongate spines in the adult males.
III. *Hemipsilichthys*

6b. Abdomen with scattered, embedded platelets; cheek with minute bristles in specimens 80 mm in total length.
IV. *Pareiorhaphis*

5b. Adipose absent; back behind dorsal sharply flattened, so that the whole of the caudal peduncle is rather rectagonal; anal far forward, the depth of the caudal peduncle contained 3.7 or more times in its length.
V. *Pareiorhina*

4b. Head short and comparatively narrow, more or less quadrangular, its length to end of supraoccipital contained about 3 2/3 times in the standard length, the greatest cheek width contained about twice in the interorbital width; adipose fin present; abdomen naked; cheeks without bristles.
VI. *Kronichthys*

1b. Lateral scutes 22-26; cleithrum extending backwards over the base of the pectoral spine.

7a. Caudal peduncle flattened below, somewhat triangular in cross-section; abdomen entirely naked; supracleithral (supratemporal) plate bordered posteroventrally by a naked area; anal short, its longest ray about 1/3 the length of the ventral.

8a. Dorsal rays I 9 or I 10.
VII. *Delturus*

8b. Dorsal rays I 7.
VIII. *Corymbophanes*

7b. Caudal peduncle rounded below; belly in adult with platelets at least along bases of lateral scutes; supracleithral plate bordered posteriorly by a few to numerous small platelets; anal rays at least half as long as the ventral.

9a. Belly almost entirely covered with small platelets in the adult; interorbital very broad, the frontals not reaching the supraorbital rim.

10a. Cheek region with well-developed bristles.
IX. *Canthopomus*

10b. Cheek region without well-developed bristles.
X. *Rhinelepis*

9b. Belly in adult largely naked, but with well-developed, transversely elongate platelets at the bases of the lowermost lateral scutes; frontals forming part of the supraorbital border.

11a. Adipose present; bristles present on cheek; 22 lateral scutes.
XI. *Pogonopoma*

11b. Adipose absent; no bristles on cheek; 25-26 lateral scutes.
XII. *Pogonopomoides*

I. *NEOPLECOSTOMUS* Eigenmann & Eigenmann

Neoplecostomus Eig. & Eig., 1888, Proc. Calif. Acad. Sci., 2nd ser., vol. 1, p. 171 (genotype by original designation *Plecostomus microps* Steindachner).

The following description is based on specimens from the Distrito Federal, from the Rio Paraíba do Sul, and from Santa Teresa, Esp. Santo.

Head broad, flattened; eyes small, superior, the interorbital more or less equal to cheek width. Snout and upper surface of head granular. Lateral borders of head without bristles. Each tooth with a well-developed lateral lobe; about 20 teeth on one side of either jaw; mandibular ramus contained about twice in the interorbital width. Teeth of lower jaw followed by one to three rows of enlarged papillae. Five or 6 irregular scutes between the supraoccipital and the dorsal. Lateral scutes in part fused along the middorsal line between the dorsal and the adipose. About 29 scutes in a lateral series.

Cleithrum not extending backwards over the base of the pectoral spine. Ventral insertion somewhat ahead of dorsal insertion. Anal I 5 or I 6, its origin slightly behind tip of last, depressed dorsal ray. Anus somewhat nearer anal origin than base of ventral spine. Abdomen with a rather regular 6-sided shield on the chest made up of small plates, each of which has 4 to 8 backwardly projecting spicules; this shield already developed to a considerable extent in a specimen 50 mm in total length. Dorsal I 7, its base contained nearly twice in its distance from the adipose. Caudal peduncle almost round in cross-section, or even slightly depressed. Caudal lobes rounded, the lower slightly longer; principal caudal rays 16.

One species (?) from Cayenne and Southeastern Brazil.

NEOPLECOSTOMUS GRANOSUS (Cuvier & Valenciennes)

Hypostomus granosus Cuv. & Val., 1840, Hist. Nat. de Poissons, vol. 15, p. 502 (Cayenne: Rio de Janeiro).

Plecostomus microps Steindachner, 1876, Sitz. Kais. Akad. Wiss. Wien, vol. 74, pt. 1, p. 688, pl. 13 (Rio de Janeiro).

Neoplecostomus microps Eig. & Eig., 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 395 (Juiz de Fora, Rio Paraíba do Sul; Goiaz).

Neoplecostomus granosus Regan, 1904, Trans. Zool. Soc. ondon, vol. 17, pt. 3, p. 306 (Cayenne; Eastern Brazil); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac., vol. 16, p. 39, pl. 23, fig. 2 (Casal, Rio Paraíba do Sul).

Neoplecostomus has been considered since the time of Regan's monograph (1904, op. cit.) as containing only one species. Yet the present author is inclined to suspect either that not all the localities attributed to it are correct — Southeastern Brazil, Goiaz, Cayenne — or that there is more than one species involved in these records. Regan, who compared Cuvier and Valenciennes' types with material from Eastern Brazil, says that only one species is represented.

The specimens of *Neoplecostomus* in the Museu Nacional are from Jacarepaguá, Distrito Federal (M.N. 640); Casal, Rio Paraíba do Sul; and from Santa Teresa, State of Esp. Santo (M. N. 4240).

II. *UPSILODUS* A. de Miranda Ribeiro

Upsilodus A. de Miranda Ribeiro, 1924, Bol. Mus. Nac., vol. 1, no. 5, p. 365 (genotype by monotypy *Upsilodus victori* A. de Miranda Ribeiro).

The following description is based on the two types of the unique species (Museu Nacional Nos. 639 & 646).

Head broad, flattened; eyes small, superior, the interorbital width about equal to the distance from the eye to the border of cheek. Top of head granular forwards almost to tip of snout, which is naked. Lateral borders of head with a few short, backwardly hooked spines. Each tooth with two, approximately equally developed, deeply divided lobes (thus resembling *Lithogenes* and certain species of *Astroblepus*). About 20 such teeth on either side in each jaw; the mandibular ramus contained about 1 1/4 times in the interorbital. Barbel free, its length about equal to eye diameter. Supraoccipital short; about 6 irregular plates between it and dorsal. Scutes not meeting along the surface or under the skin between the dorsal and adipose. Lateral scutes about 30, the four lower series incomplete forwards.

Cleithrum not extending backwards over the top of the pectoral spine, which is free to rotate in an arc of over 30°. Abdomen entirely naked. Ventral insertion about under dorsal spine. Anal I 5, originating very slightly behind tip of last, depressed dorsal ray. Anus posterior, its distance from anal contained about 4 times in its distance from base of ventral spine. Dorsal I 7, its base contained about 1 2/3 times in its distance from adipose. About 6, keeled, azygous, preadipose scutes, the forward ones lying free in the naked middorsal ridge, the posterior adjoining the lateral scutes. Caudal concave posteriorly, the lowermost ray somewhat longer than the uppermost; principal rays 16.

One species, known only from the watershed of the Paraíba do Sul.

UPSILODUS VICTORI A. de Miranda Ribeiro (Plate I, figs. 1 and 2)

Hemipsilichthys gobio Eig. & Eig. (non Lütken), 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 438 (Rio Paraíba do Sul).

Upsilodus victori A. de Miranda Ribeiro, 1924, Bol. Mus. Nac., vol. 1, no. 5, p. 366

(Rio Paquequer, Teresópolis, State of Rio de Janeiro) and 1937, O Campo, vol. 8, no. 93 (September), p. 57, fig.

Lectotype, 127 mm in total length (M. N. No. 639), and lectoparatype, 130 mm in total length (M. N. N.° 646), examined. These specimens are said to be male and female by Miranda Ribeiro, 1924, but if so the sexual differences are little apparent externally.

III. *HEMIPSILICHTHYS* Eigenmann & Eigenmann

Xenomystus Lütken, 1873, Vidensk. Medd. no. 13, p. 217, pl. 4 (name preoccupied in ichthyology, 1868).

Hemipsilichthys Eig. & Eig., 1889, Proc. Calif. Acad. Sci., 2nd ser., vol. 2, p. 46 (genotype by original designation *Xenomystus gobio* Lütken).

The following generic description is based on six specimens of *Hemipsilichthys gobio* in the Museu Nacional, and on the published descriptions of the other three species.

The genus is at once remarkable for the long, straight spines extending out horizontally from the cheek of the adult male. Head broad, flattened; eyes small, superior, the interorbital distance more or less equal to the distance from the eye to the edge of the cheek. Tip of snout granular in young, with prickles in older specimens. Buccal disk with or without free barbels opposite corners of mouth. Teeth with a minute lateral lobe or, in *Hemipsilichthys gobio*, simple, without a trace of a lateral lobe; about 55 on one side of either jaw. Mandibular ramus contained about 1 1/3 to 1 3/4 in interorbital (not stated in *H. regani*). Posterior border of supraoccipital poorly defined; 4 or more irregular plates between supraoccipital and predorsal plate. Dorsal base bordered by a fleshy area covering the scutes which extends a short distance behind the dorsal base along the midline. Lateral scutes 27 to 29.

Cleithrum not extending backwards over the top of the pectoral spine. Base of pectoral spine free to rotate in an arc of about 30°. Ventral insertion about under dorsal spine. Abdomen entirely naked. Anal I 5, inserted ahead of tip of last, depressed dorsal ray. Anus about half as far from anal origin as from base of ventral spine. Dorsal I 7, its base contained about 1 1/3 times in its distance from the base of the adipose in *H. gobio*. About 5, azygous, preadipose plates, the dividing line between these and the lateral plates poorly defined. Caudal profile slightly concave, the lower lobe slightly longer than the upper; with 16 principal rays.

Four species from the states of Amazonas, Rio de Janeiro, and Santa Catarina. A fifth species, *H. cerosus*, is named by A. de Miranda Ribeiro (1924, Bol. Mus. Nac., vol. 1, n.° 5, p. 364), but this is a *nomen nudum*.

KEY TO THE SPECIES OF *HEMIPSILICHTHYS*

1a. Pectoral spines in adult male short and swollen, with straight spines on the outer border which equal those of the cheek in size; a barbel on the outer edge of the buccal disk opposite each corner of mouth.
1. *Hemipsilichthys gobio*

1b. Pectoral spines in adult male without elongate spines similar to those on cheek; barbel at outer edge of the buccal disk absent or rudimentary.

2a. Length of longest cheek spines in adult male less than interorbital width; greatest width of head greater than length of head measured to upper angle of gill opening; 7-9 plates between dorsal and adipose.

3a. Pectoral spine reaching farther posteriorly than any of the branched rays except the first.
2. *H. cameroni*

3b. Pectoral fin rounded, the second branched ray reaching farthest posteriorly when the fin is depressed.
3. *H. steindachneri*

2b. Adult male with longest cheek spines twice the interorbital width; the width of the head about equal to head length; 4 plates between the dorsal and adipose.
4. *H. regani*

1. *Hemipsilichthys gobio* (Lütken)

Xenomystus gobio Lütken, 1873, Vidensk. Medd., no. 13, p. 217, pl. 4 (locality?).

Hemipsilichthys garbei R. von Ihering, 1911, Rev. Mus. Paulista, vol. 8, p. 399 (Rio Macaé, State of Rio de Janeiro).

Hemipsilichthys gobio A. de Miranda Ribeiro, 1918, Rev. Soc. Bras. Sci., no. 2, pls. 3 & 4.

Six specimens, 110-143 mm in total length, M. N. 945, collected by E. Garbe at Novo Friburgo, State of Rio de Janeiro. Three, 115-143 mm, seem to be adult males.

while the remaining three, 110-120 mm, are either female or immature. One of the above specimens has been skeletonized.

The barbel on the edge of the buccal disk at each corner of the mouth seems to be well developed in the above specimens; the length of its free part is slightly greater than the eye diameter. In the smallest adult male the longest cheek spines are somewhat shorter, in the largest somewhat longer than the interorbital width. Even the 110 mm female has spines on the cheek and pectoral that are only slightly less than an eye diameter in length. In all specimens the tip of the pectoral spine reaches about 1/5 to 1/4 of the way along the ventral.

H. gobio seems to be quite distinct from the other three species of the genus.

2. *Hemipsilichthys cameroni* (Steindachner)

Psilichthys cameroni Steindachner, 1907, Anz. Kais. Akad. Wiss. Wien, p. 82 (Rio Cubatão, near Teresópolis, State of Santa Catarina, Brazil) [not seen].

Hemipsilichthys cameroni Steindachner, 1907, Sitz. Kais. Akad. Wiss. Wien, vol. 96, p. 475, pls. 1 & 2 (Rio Cubatão, near Teresópolis, Santa Catarina).

Hemipsilichthys calmoni Steindachner, 1908, Anz. Kais. Akad. Wiss. Wien, p. 31 [not seen].

Hemipsilichthys duseni Steindachner, 1908, Anz. Kais. Akad. Wiss. Wien, p. 31 [not seen].

?Hemipsilichthys cameroni Giltay, 1936, Bull. Mus. Roy. Hist. Nat. Belgique, vol. 12, no. 14, p. 4 (Rio Jaú, south of Rio Negro, State of Amazonas, Brazil).

No specimens seen.

Though this species has been carefully and extensively described and figured by Steindachner (1907, Sitz. Kais. Akad. Wiss. Wien), it remains dubiously distinguishable from both *Hemipsilichthys steindachneri* and *H. regani*. This is largely because there is obviously a great sexual differentiation plus perhaps a seasonal development of secondary sexual characters. It is difficult in the present state of our knowledge to determine which characters are sexual and which specific.

The species *H. cameroni* as here recognized is known from one collection reported by Steindachner, who later three times changed the name he originally used for it. Giltay's record of this species from the opposite end of Brazil is certainly dubious, especially since it has not been taken in the intervening area.

In Steindachner's collection ripe females of this species were from 8 to 10 cm long, while presumably ripe males were from 10.5 to 13.3 cm.

3. *Hemipsilichthys steindachneri* (A. de Miranda Ribeiro)

Hemipsilichthys calmoni Steindachner, 1911 (non 1908), Ann. K. K. Naturhist. Hofmus., vol. 24, p. 430, fig. (hill streams of the Rio Itapocú district, State of Santa Catarina, Brazil).

Pareiorhaphis steindachneri A. de Miranda Ribeiro, 1918, Rev. Soc. Bras. Sci., no. 2, p. 107 (on Steindachner's description). No specimens seen.

This species, on the basis of a large series of specimens presumably compared directly with the types of *H. cameroni*, was considered to be the same as that species by Steindachner. The elongate pectorals in *H. cameroni* were considered to be due to seasonal sexual development. Of other differentiating characters there are certainly few. Perhaps Steindachner is right in uniting the two forms, especially since they were taken in two neighboring coastal streams in Santa Catarina. Yet the lengthening of the pectoral spine seems a peculiar character to be a seasonal sexual development. Consequently Miranda Ribeiro's separation of the two forms is provisionally followed.

The largest, undoubtedly adult males in Steindachner's collection of this species were 14.0 to 16.7 cm while the largest, adult females were 12.2 and 12.3 cm.

4. *Hemipsilichthys regani* Giltay

Hemipsilichthys regani Giltay, 1936, Bull. Mus. Roy. Hist. Nat. Belgique, vol. 12, no. 14, p. 6, fig. (Rio Curi Curiai, to the south of Rio Negro, Amazonas, Brazil).

No specimens seen.

This species is known from a single specimen, an adult male 11.5 cm in length. It seems to be closely related to *H. cameroni* Steindachner. Of the differences from that

species given by Giltay, the size of the cheek spines and the head width may be related at least in part to the degree of sexual development, and are consequently not entirely satisfactory. The difference in the number of scutes between the dorsal and adipose may arise from Giltay's having used a different method of counting these scutes than that used by Steindachner. In short, all the diagnostic characters used by Giltay, and followed by the present author, are open to suspicion. The two species, however, are undoubtedly different, if only because of geographical considerations.

IV. *PAREIORHAPHIS* A. de Miranda Ribeiro

Pareiorhaphis A. de Miranda Ribeiro, 1918, Rev. Soc. Bras. Sci., no. 2, p. 106 (type here designated *Pareiorhaphis duseni* (A. de Miranda Ribeiro).

Pareiorhaphis A. de Miranda Ribeiro, 1924, Bol. Mus. Nac., vol. 1, no. 5, p. 365 (change of spelling for *Pareiorhaphis*).

The following description is based upon three (immature?) specimens in the Museu Nacional collections.

Head broad, flattened; eyes small, superior, the interorbital width more or less equal to cheek width. Top of head granular to its margin except for a small naked area at the tip of snout. Lateral borders of head with minute bristles, the bristly area extending forwards to the naked area at tip of snout. Teeth simple or with a small lateral lobe, about 25 to 35 on one side of either jaw; mandibular ramus contained 1 1/2 to 2 times in interorbital. Barbel an unfree flap. Supraoccipital short; 6 or 7 irregular plates between it and dorsal origin. Some of the lateral pairs of scutes meeting, but not fusing, along the midline of the back between the dorsal and the adipose. About 30 scutes in a lateral series.

Cleithrum not extending backwards over the base of the pectoral spine. Ventral insertion somewhat ahead of dorsal insertion. Abdomen with small platelets from which arise backwardly projecting spicules as in *Neoplecostomus*, but the plates not nearly so well developed nor so regularly arranged as in that genus. Anal I 5, originating very slight behind tip of last, depressed dorsal ray. Anus anterior, only very slightly nearer anal origin than base of ventral spine. Dorsal I 7, its base contained about 1 1/2 times in its distance from adipose. Back rounded between dorsal and caudal. One, azygous, preadipose plate. Caudal broken in available specimens, with 16 principal rays.

As here understood, the genus contains two species, one from the Rio Betarí, Iporanga, State of São Paulo, and one probably from the State of Paraná.

KEY TO THE SPECIES OF *PAREIORHAPHIS*

1a. Each tooth with a small lateral lobe; bony interorbital contained 1.1 times in the distance between the lower rim of the eye and the outermost point on cheek; anus about equidistant from anal origin and base of last ventral ray.
1. *Pareiorhaphis duseni*

1b. Teeth all simple; bony interorbital contained 1.3 to 1.5 times in greatest cheek width; anus considerably nearer base of last ventral ray than anal origin.
2. *P. alipionis*

1. *Pareiorhaphis duseni* (A. de Miranda Ribeiro)

Hemipsilichthys duseni A. de Miranda Ribeiro, 1907, A Lavoura, vol. 11, no. 5, p. 187 (in part), fig. (State of Paraná, Brazil); A. de Miranda Ribeiro, 1911, Arch. Mus. Nac., vol. 16, p. 37 (in part) (on the type); A. de Miranda Ribeiro, 1918, Rev. Soc. Bras. Sci., no. 2, pls. 5 & 6 (on the type). (Included under *Pareiorhaphis* for the first time.)

Pareioraphis (*sic*) *duseni* A. de Miranda Ribeiro, 1924, Bol. Mus. Nac., vol. 1, no. 5, p. 365.

Miranda Ribeiro's original and subsequent descriptions of this species were based on three specimens, one sent from the State of Paraná by Dusén and two collected by R. Krone from the "Ribeirão do Monjolinho" in the basin of the Rio Iporanga, State of São Paulo. The Museu Nacional collections contained three specimens in a single bottle (M. N. 772) with the label "*Hemipsilichthys duseni* Mir. Rib. (Typos), Rio Bethary, São Paulo, coll. Ricardo Krone, det. Prof. Alipio de Mir. Ribeiro". One of the three specimens contained in this bottle is figured in plate 23 of Arch. Mus. Nac. (1911) and a second of the three specimens is shown in plates 5 and 6 of Miranda Ribeiro (1918). In neither of these works does A. de Miranda Ribeiro mention having received further specimens of

Table I. Measurements and Counts for Pareiorhaphis duseni and P. alipionis

	P. DUSENI	P. ALIPIONIS	
Sex	male	male	female
Standard length	71 mm	80 mm	77 mm
Head to upper angle of gill opening	20.3 (3.54 in S. L.)	21.9 (3.65)	20.0 (3.85)
Head to the end of the supraoccipital	22.1 (3.22 in S. L.)	24.6 (3.26)	22.7 (3.39)
Width of head	22.0	23.8	22.0
Depth of body	ca. 12 (5.9 in S. L.)	14.3 (5.6)	13.0 (5.9)
Snout	13.6	16.6	14.3
Bony interorbital	8.0 (1.07 in cheek)	6.8 (1.45)	7.0 (1.28)
Eye	2.7 (3.0 in inter., 5.0 in sn.)	2.8 (2.4, 5.9)	2.7 (2.6,5.3)
Distance between anterior nostrils	4.4	4.3	4.1
Eye to outermost part of cheek	8.6	9.9	9.0
Mandibular ramus	4.3 (1.9 in inter.)	5.2 (1.3)	4.9 (1.4)
Snout to dorsal origin	29.3	33.6	31.9
Snout to ventral base	28.8 (2.47 in S. L.)	31.0 (2.58)	31.2 (2.47)
Snout to anus	38.2 (1.86 in S. L.)	41.0 (1.95)	39.7 (1.94)
Orbit to dorsal origin	15.6	17.0	17.1
Length of dorsal spine	17.8	18.6	ca. 16.5
Dorsal base	10.6	11.0	12.5
Dorsal to adipose	15.7	18.2	16.6
Length of adipose spine	7.1	6.1	6.1
Length of pectoral spine	21.2	24.5	20.8
Length of ventral spine	17.1	19.0	18.2
Length of anal spine	14.0	14.4	broken
Anus to base of ventral spine	12.0	11.6	11.6
Anus to anal origin	8.6 (1.4 in anus-vent.)	10.0 (1.2)	10.0 (1.2)
Distance between outside borders of pectoral bases	21.5	24.4	23.0
Distance between outside borders of ventral bases	13.7 (1.57 in dist. bet. pect. bases)	14.7 (1.66)	13.7 (1.68)
Length of caudal peduncle	20.2	24.8	23.3
Depth of caudal peduncle	7.3 (2.77 in L. of caud. ped.)	8.2 (3.03)	7.3 (3.19)
Number of lateral scutes	30-32	29-30	30-31
Scutes between dorsal and adipose	10	11	10
Pairs of lateral scutes meeting along middorsal line between dorsal and adipose	4	4	5
Number of teeth	30 (on one side) above, ca. 26 below	38/36	ca. 31/ca. 35

H. duseni from R. Krone. Furthermore, the Rio Bethary (now Betarí) is a river of the Rio Iporanga district of São Paulo; whether the Ribeirão do Monjolinho is connected with it the present author does not know, having been able to find no reference to a Ribeirão do Monjolinho in this part of São Paulo.

Now, the three specimens of M. N. 772 represent two species. The smallest seems to be a male representing one species, and the two larger, a male and female, another. Since Miranda Ribeiro (1907) speaks of Dusén's specimen being smaller, and of Krone's two specimens being male and female, there is a strong suggestion that the smallest of the three is Dusén's fish, which has subsequently been confused with Krone's material. (*Hemipsilichthys duseni* was described in a paper dealing with Krone's collections of Iporanga fishes). All this being as it is, the smallest of the three specimens in the bottle labeled M. N. 772 is hereby selected as lectotype of *Pareiorhaphis duseni* (A. de Miranda Ribeiro). It is this smallest specimen that figures largely in the descriptions of Miranda Ribeiro, 1907 and 1911, and which is shown in plates 5 and 6 of Miranda Ribeiro, 1924. The synonymy for this species that precedes the present discussion is made up on the supposition that this small specimen was sent from the State of Paraná by Dusén.

Pareiorhaphis duseni (A. de Miranda Ribeiro) as here restricted differs from *Pareiorhaphis alipionis* (the other two specimens in M. N. 772) most decisively in the characters given in the key. Miranda Ribeiro noticed certain differences between the three specimens, but attributed them to age and sex. Certain of the differences he included are undoubtedly due to these causes, but it is hard to believe that the characters given in the key can be included in this catagory. A description of the general appearance of this fish is not given here since the species has already been figured twice. The measurement characters, however, may be found in Table I.

Steindachner considered *Pareiorhaphis duseni* the same as *Hemipsilichthys calmoni* (= *cameroni*) at one time; however, the latter species has no abdominal spicules. Later Steindachner (see 1911, *Ann. K. K. Naturhist. Hofmus.*, vol. 24, p. 430) considered *P.*

duseni a synonym of *Neoplecostomus granosus;* but *P. duseni* has neither the enlarged papillae behind the tooth rows of the lower jaw nor the squarish shield arrangement of the abdominal platelets.

2. **Pareiorhaphis alipionis** new species

Hemipsilichthys duseni A. de Miranda Ribeiro, 1907, A Lavoura, vol. 11, no. 5, p. 187 (in part) (Ribeirão do Monjolinho, Rio Iporanga basin, State of São Paulo) and 1924, Arch. Mus. Nac., vol. 16, p. 37 (in part), pl. 23, fig. 1 (São Paulo specimens).

Holotype: a specimen 80 mm in standard length, almost undoubtedly male, collected according to the label in the "Rio Bethary, São Paulo" by Ricardo Krone (M. N. 4241). Paratype: a specimen 77 mm in standard length, almost undoubtedly female, with the same label (M. N. 4242). These two specimens are almost certainly those which A. de Miranda Ribeiro (1907) says were collected in the Ribeirão do Monjolinho, in the Iporanga basin of São Paulo by R. Krone in 1906 or 1907.

Description: This species differs from the preceding most significantly in the characters given in the key. Of these, the difference in teeth is probably the most valid; Miranda Ribeiro has, as a matter of fact, considered the difference between simple and lobed teeth to be a generic character in this group (1924).

Measurement characters for this and the preceding species are given in Table I.

It is a pleasure to name this species for Alipio de Miranda Ribeiro, who seems to have been the first and, with the probable exception of Steindachner, the only man to realize the interrelationship of the genera treated in this paper.

V. *PAREIORHINA* new genus

Type: *Rhinelepis rudolphi* A. de Miranda Ribeiro.

The following description is based on four specimens of *Pareiorhina rudolphi* 56-61 mm in total length.

Head broad, flattened; eyes small, superior, the interorbital width more or less equal to cheek width. Top of head granular to its margin except for a small naked area at tip of snout. Lateral borders of head granular, but without developed bristles. Teeth simple, about 25 to 40 on one side of either jaw; mandibular ramus contained about 1.2 to 1.5 times in the interorbital width. Barbel very short. Four to 6 irregular scutes between supraoccipital and dorsal. Lateral scutes fused along the middorsal line between the dorsal and caudal. Adipose absent. About 27 to 30 scutes in a lateral series.

Cleithrum not extending backwards over the base of the pectoral spine. Ventral insertion somewhat ahead of dorsal insertion. Anal I 5, originating about under tip of last, depressed dorsal ray. Anus nearly twice as far from base of ventral spine as from anal origin. Abdomen naked in the small specimens at hand. Dorsal I 7. Caudal peduncle distinctly flattened above between the dorsal and caudal. Caudal concave, the lower half very slightly longer: 16 principal caudal rays.

This genus is closely related to *Pareiorhaphis*, from which it differs most obviously in the lack of an adipose fin. In *Pareiorhaphis* there is also a short naked area in the middorsal line behind the dorsal and one on the midventral line behind the anal, which *Pareiorhina* does not have. The middorsal area in *Pareiorhina*, besides being completely scuted, is distinctly flattened between the dorsal and caudal, whereas it is rounded in *Pareiorhaphis*. Of differential characters which could be due to the small size of the specimens at hand may be mentioned the naked abdomen and the absence of bristles on the lateral borders of the face; *Pareiorhaphis* has embedded platelets on the belly and small whiskers on the face.

One species: *Pareiorhina rudolphi* (A. de Miranda Ribeiro).

Pareia (Gr.) — cheek; *rhine* (Gr.) — file.

Pareiorhina rudolphi (A. de Miranda Ribeiro) (Plate 2, figs. 3 and 4)

Plecostomus (*Rhinelepis*) *microps* R. von Ihering (non *Plecostomus microps* Steindachner), 1907, Notas Preliminares Rev. Mus. Paulista, vol. 1, p. 25 (Piquete, State of São Paulo) [not seen].

Rhinelepis rudolphi A. de Miranda Ribeiro, 1911, Arch. Mus. Nac., vol. 16, p. 84 (substitution of name); 1918, Rev. Mus. Paulista, vol. 10, p. 716 (on the type).

The four specimens in the Museu Nacional of the species here described (M. N. 987) were labeled "*Rhinelepis parahybae* Steind., Proc: Itatiaya — Mont Serrat, leg. Carlos Moreira". A second label inside the bottle gives the same locality and the date "XII-1903".

General appearance much as in *Pareiorhaphis* but the head and body flatter and the caudal peduncle more elongate. The qualitative characters of this species are largely given under the generic description, while the measurable and countable characters are stated in Table II.

Table II. Measurements and Counts for Pareiorhina rudolphi

Total length	61 mm	60 mm	57 mm	56 mm
Standard length	48	48	45	45
Head to upper angle of gill opening	13.6	13.6	12.9	12.9
Head to the end of the supraoccipital	15.4	15.6	14.2	14.8
Width of head	13.6	13.6	12.7	12.1
Depth of body	7.4	7.9	7.3	7.0
Snout	9.6	9.6	8.8	9.0
Bony interorbital	4.9	4.7	4.3	4.5
Eye	2.0	1.6	1.7	1.3
Distance between anterior nostrils	2.4	2.5	2.4	2.6
Eye to outermost part of cheek	4.8	5.0	4.9	5.0
Mandibular ramus	3.4	3.7	3.4	3.1
Snout to dorsal origin	20.0	20.7	19.6	19.2
Snout to ventral base	19.0	18.7	17.2	18.0
Snout to anus	25.5	25.0	22.4	23.1
Orbit to dorsal origin	10.0	10.8	10.6	10.0
Length of dorsal spine	10.8	11.2	9.8	9.8
Dorsal base	6.1	6.2	5.7	5.7
Length of pectoral spine	9.7	9.6	9.3	9.2
Length of ventral spine	10.2	9.2	8.7	8.3
Length of anal spine	8.7	7.1	7.4	7.4
Anus to base of ventral spine	7.7	7.3	7.2	7.0
Anus to anal origin	3.7	4.1	4.2	4.5
Distance between outside borders of pectoral bases	13.2	13.1	11.9	12.0
Distance between outside borders of ventral bases	8.1	8.1	7.4	7.3
Length of caudal peduncle	16.2	15.9	14.8	14.7
Depth of caudal peduncle	4.1	4.2	4.0	4.0
Number of lateral scutes	30-30	29-29	27-28	29-ca.30
Number of teeth (on one side)	ca.41/45	45/broken	44/broken	43/43

Tooth rows more or less straight, those of the mandible not greatly incurved in the middle. Pectorals moderate, the first branched ray the longest, reaching about 1/3 to 2/5 of the way along ventrals. Ventrals reaching beyond anal origin in one specimen, not to anal origin in other three. Anus apparently similar in all four specimens. Dorsal short, the spine, when depressed, reaching farther posteriorly than the last ray. Anal I 5, the origin about under tip of last, depressed dorsal ray.

Color faded, but the fish apparently originally with dark blotches on a light ground. Three fairly well-developed dark crossbars across back between dorsal and caudal. A dark blotch on dorsal. Two small dark marks, one at the base of the upper and one at the base of the lower caudal lobe. A submarginal dark band on caudal.

The specimens differ from *Rhinelepis parahybae*, with which they were identified, in numerous respects. *R. parahybae* has, for example, a much broader interorbital, fewer scutes in the lateral line, the anus immediately in front of the anal origin, etc.

VI. *KRONICHTHYS* A. de Miranda Ribeiro

Kronichthys A. de Miranda Ribeiro, 1908, Kosmos, no. 2 (genotype by monotypy *Kronichthys subteres* A. de Miranda Ribeiro = *Plecostomus heylandii* Boulenger) [not seen].

The following description is based on two specimens 110 and 115 mm in total length from Iporanga, São Paulo.

This genus bears a very different superficial appearance than *Pareiorhaphis*, *Hemipsilichthys*, etc. The body is more or less cylindrical and the heald rather high and quadrangular. Another difference which is difficult to state but obvious on comparison is that towards their inner ends the tooth rows of the two sides of either jaw turn sharply inwards and run almost parallel to one another; the tooth rows of no other genus are curved to this extent.

Head comparatively high and narrow; eyes small, superolateral, the cheek width contained nearly twice in the interorbital width. Snout granular almost, but not quite, to its border. Barbel short or absent. A small predorsal scute plus 4 or 5 irregular scutes between supraoccipital and dorsal origin. Fleshy area at dorsal base small. Lateral scutes 30 to 32.

Cleithrum extending backwards over the base of the pectoral spine. Ventral insertion slightly behind dorsal insertion. Abdomen entirely naked. Anal I 5, originating under last, depressed dorsal ray. Anus slightly nearer anal origin than base of ventral spine. Dorsal base contained more than 1 1/2 times in its distance from adipose. On, azygous, preadipose scute. Caudal peduncle somewhat

flattened above and below. Caudal slightly emarginate, its longest, lowermost ray considerably shorter than head; principal rays of caudal 16.

The single described species of the genus has hitherto been recorded only from the State of São Paulo. Five specimens of this fish, in the Museu Nacional, have been collected by A. Carvalho at Pedra Branca, Parati, State of Rio de Janeiro. The synonymy of the species appears to be as follows.

Kronichthys heylandii (Boulenger)

Plecostomus heylandii Boulenger, 1900, Ann. Mag. Nat. Hist., ser. 7, vol. 5, p. 165 (Santos, State of São Paulo).

Hemipsilichthys gobio Regan (partim), 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 221 (Santos).

Kronichthys subteres A. de Miranda Ribeiro. 1908, Kosmos, n.° 2 (Rios Betari, Pardo, and Iporanga, State of São Paulo) [not seen]; A. de Miranda Ribeiro, 1911, Arch. Mus. Nac., vol. 16, p. 80, pl. 29, fig. 1 (Rios Betari, Pardo, and Iporanga, State of São Paulo).

Kronichthys heylandii A. de Miranda Ribeiro, 1918, Rev. Soc. Bras. Sci., no. 2, p. 106, pls. 1 & 2.

VII. *DELTURUS* Eigenmann & Eigenmann

Delturus Eig. & Eig., 1889, Proc. Calif. Acad. Sci., 2nd ser., vol. 2, p. 45 (genotype by original designation *Delturus parahybae* Eig. & Eig.).

Carinotus La Monte, 1933, Amer. Mus. Novitates, no. 591, p. 1 (genotype by original designation *Plecostomus carinotus* La Monte).

The following description is based on a stuffed male specimen of *Delturus*, presumably from the Rio Doce, in the collections of the Divisão de Caça e Pesca in Rio de Janeiro, and on a preserved specimen without locality in the Museu Nacional (M. N. 701).

Head rather high; the eye comparatively large, contained about twice in the interorbital width. Top of head granular to tip of snout. Bristles on lateral borders of head and at pectoral base in adult males. Teeth with a well-developed lateral lobe, about 20 (or more) on one side of either jaw; mandibular ramus about 1.3 in the interorbital width. Barbel free, equal to about 1/2 the eye diameter. Four, more or less regular, azygous plates and a small predorsal plate between the supraoccipital and the dorsal. Lateral scutes in part meeting along the midline between the dorsal and the adipose. Lateral scutes 25.

Cleithrum extending backwards over the top of the base of the pectoral spine, limiting it strictly to a backwards and forwards plane of motion. Abdomen entirely naked. Ventral insertion somewhat behind dorsal insertion. Anal I 5, originating about under base of last dorsal ray. Anus immediately before anal. Dorsal I 9 or I 10, the last ray attached by a membrane to the three scutes following it. Dorsal base greater than its distance from adipose. Three or 4, sharply keeled, azygous, preadipose scutes. Caudal peduncle flattened below. Caudal obliquely concave, the lowermost ray the longest; principal caudal rays 16.

This genus was considered by Eigenmann & Eigenmann (1890, *Occ. Pap. Calif. Acad. Sci.*, vol. 1) to contain two species, *D. angulicauda* (Steindachner) from the Rio Mucuri, and *D. parahybae* from the Rio Paraíba do Sul. It is impossible to judge concerning the validity of these two species on the basis of the material at hand. As to *Plecostomus* (*Carinotus*) *carinotus* La Monte, though this is undoubedly a species of *Delturus*, as was originally suggested to the present author by Dr. Democrito da Silva, the question of specific determination is more difficult. The tooth count, as given by La Monte, is far higher than in the specimens available for the present paper. *Delturus carinotus* (La Monte) is consequently left provisionally as a valid species.

The species of this genus then stand as: 1) *Delturus angulicauda* (Steindachner) (1876, *Sitz. Kais. Akad. Wiss. Wien*, vol. 74, p. 114, pl. 12) from the Rio Mucuri; 2) *Delturus parahybae* Eig. & Eig. (1889, loc. cit.) from the Rio Paraíba do Sul; and 3) *Delturus parahybae* Eig. & Eig. (1889, loc. cit.) from the Rio Doce.

VIII. *CORYMBOPHANES* Eigenmann

Corymbophanes Eigenmann, 1909, Ann. Carnegie Mus., vol. 6, p. 5 (genotype by

original designation *Corymbophanes andersoni* Eigenmann).

The following description is based partly on Eigenmann's description and plate of *Corymbophanes andersoni* (*Mem. Carnegie Mus.*, vol. 5, p. 229, pl. 27) and partly on the specimens of *C. bahianus* described in the present paper. The parts of the description based on the latter species alone are placed in parentheses.

Head flattened; eyes superior, moderately small, their diameter contained about 2 1/3 to 3 times in the interorbital width. (Cheek width somewhat less than interorbital width.) Top of head granular forwards almost to the tip of snout, which is naked. Lateral borders of head with short marginal bristles. (Each tooth with a small lateral lobe), about 30 to 40 on one side of either jaw. Mandibular ramus contained about 1 1/2 to 2 times in interorbital. Barbel free, short. About 4 irregular scutes plus a minute predorsal plate between supraoccipital and dorsal origin. Lateral scutes behind dorsal fused along the middorsal line. Adipose absent (or present). Lateral scutes 24 to 26.

Cleithrum with a broad flange extending backwards over the base of the pectoral spine. Abdomen entirely naked. Ventral insertion slightly behind dorsal insertion. (Anus about twice as far from base of ventral spine as from anal origin, the anus to anal-origin area more or less encroached upon by the lowermost lateral plates. Caudal peduncle decidedly flattened below.) Dorsal I 7, (its base contained about 1 1/5 times in its distance from adipose. One or 2, azygous, preadipose plates.) Anal I 4 (I 5). Caudal obliquely concave, (with 16 principal rays).

The genotype is known from one specimen 84 mm long taken by Eigenmann in the British Guiana highlands. A second species, *Corymbophanes veneznelae* Schultz (1944, *Zoologica*, vol. 29, pt. 1, p. 41), has been attributed to this genus, but does not belong here, differing in having a naked margin to the snout, a greater number of dorsal rays, spinules in the opercular region, etc. Another species of *Corymbophanes* is described below.

Corymbophanes bahianus new species (Plate 3, figs. 5 and 6)

Holotype: a male (?) 98 mm in total length taken at Fazenda Almada, Ilheus, Bahia by G. Pereira, Feb. 16-22, 1945. (M. N. 4243)

Paratype: a female (?) 98 mm in total length taken with the type. (M. N. 4244)

A third specimen (paratype) of this species was collected by João Moojen de Oliveira also at Ilheus, Bahia. (M. N. 4245)

Measurements and counts for the three specimens are given in Table III.

Table III. Measurements and Counts for Corymbophanes bahianus

	G. PEREIRA–FAZENDA ALMADA, ILHÉUS		MOOJEN-ILHÉUS
	Holotype	Paratype	Paratype
Sex	male ?	female ?	
Total length	98	98	99
Standard length	79	76	79
Head to upper angle of gill opening	19.9	20.8	20.0
Head to the end of the supraoccipital	23.9	23.7	21.9
Width of head	21.3	23.2	21.7
Depth of body	13.3	14.3	ca. 12.7
Snout	14.5	14.6	13.4
Bony interorbital	8.3	8.6	8.7
Eye	3.4	3.8	3.5
Distance between anterior nostrils	3.7	3.8	ca. 4
Eye to outermost part of cheek	7.2	8.0	7.8
Mandibular ramus	4.3	5.2	4.0
Snout to dorsal origin	32.0	32.3	31.0
Snout to ventral base	32.0	32.0	33.2
Snout to anus	43.1	43.7	44.2
Orbit to dorsal origin	16.8	16.4	17.6
Length of dorsal spine	16.8	17.7	ca. 17.3
Dorsal base	14.8	15.0	16.0
Dorsal to adipose	18.0	18.0	18.5
Length of adipose spine	6.0	5.8	6.6
Length of pectoral spine	19.2	19.7	17.7
Length of ventral spine	15.8	17.8	17.0
Length of anal spine	6.8	7.8	7.7
Anus to base of ventral spine	13.6	14.9	14.0
Anus to anal origin	7.7	6.2	6.2
Distance between outside borders of pectoral bases	22.4	23.9	22.6
Distance between outside borders of ventral bases	17.7	18.8	17.7
Length of caudal peduncle	26.0	23.2	26.6
Depth of caudal peduncle	8.2	8.3	8.3
Number of lateral scutes	25-26	24-25	26-26
Scutes between dorsal and adipose	7	8	8
Number of teeth (on one side)	39,41	37,33	34,30

Pectorals with the first branched ray the longest, reaching about 1/5 of the way along ventrals. Ventrals about reaching anal. Anal small, originating about under middle of last, depressed dorsal ray. Dorsal spine when depressed reaching slightly beyond base of last ray. Scutes rough, but not ridged.

Head, body, and fin rays gray with poorly defined darker spots equal to about 1/2 the eye diameter.

This species differs at once from *Corymbophanes andersoni* in the possession of an adipose fin. This character does not seem to have much phyletic importance alone, and the only other differences that can be found between *C. bahianus* and Eigenmann's description of *C. andersoni* are the presence of one more anal ray (I 5) in the former species and certain minor descrepancies in proportion. The I 4 anal count given for *C. andersoni* would be important, if true, but it may all too easily be an error. A direct comparison of specimens of these two species may show sufficient further characters to warrant placing them in different genera, but such separation seems inadvisable here.

IX. *CANTHOPOMUS* Eigenmann

Canthopomus Eigenmann, 1910, Repts. Princeton Univ. Expeds. Patagonia, 1896-1899, vol. 3, pt. 4, p. 407 (genotype by original designation *Rhinelepis genibarbis* Cuv. & Val.).

No specimens of this genus are available. So far as can be seen from the literature, it differs from *Rhinelepis* chiefly in the presence of bristles on the opercular region. This character hardly justifies a generic separation in itself, but there may be other characters associated with it. Incidentally, Cuvier & Valenciennes give the caudal count of *R. genibarbis* as 14.

In Regan's monograph (1904) *Rhinelepis agassizii* Steindachner is considered a synonym of *Plecostomus* (*Canthopomus*) *genibarbis* (Cuv. & Val.); and another species, *Plecostomus* (*Canthopomus*) *pellegrini*, is described. As no specimens of the genus are available, the safest policy seems to be to consider all three species provisionally distinct. *Canthopomus montebelloi* Fowler (1940, *Proc. Acad. Nat. Sci. Philadelphia*, vol. 92, p. 55) appears to belong to the Loricariinae.

X. *RHINELEPIS* Agassiz

Rhinelepis Agassiz, 1829, Selecta Genera et Species Piscium, p. 4 (genotype by monotypy *Rhinelepis aspera* Agassiz).

Rinelepis Cuvier, 1829, Règne Anim., 2nd ed., vol. 2, p. 301 (emendation for *Rhinelepis*).

The following description is based in part on the literature and in part on a specimen of *Rhinelepis* from the Rio Piracicaba, São Paulo, 335 mm in total length.

Head broad, flattened; eyes small, not bordered above by the frontals; interorbital width nearly twice the cheek width. Top of head granular to its margin, without any naked area on tip of snout. Upper lip granular nearly or quite to base of barbel. Lateral borders of head without bristles. Supracleithral plate bordered posteroventrally by small plates. Teeth simple or with a small lateral lobe. About 35 teeth in one side of either jaw, and mandibular ramus contained about 4 times in interorbital in the specimen at hand. Gill openings extending well in towards isthmus on the under side of head, the distance between the gill openings contained about 3 times in the head width. Barbel short. Supraoccipital short: 3 plates between it and the predorsal plate on the middorsal line. Scutes 24 or 25 in a longitudinal series.

Cleithrum extending backwards over base of pectoral spine. Ventral insertion slightly behind dorsal origin. Lower surface of head and belly almost completely covered with plates in adult. Dorsal I 7. Adipose absent, its position indicated by 1 or 2, poorly defined, azygous scutes. Back rather flattish behind dorsal. Anal I 5, originating under last, depressed dorsal ray. Anus close to anal origin. Caudal peduncle compressed, about equally rounded above and below. Caudal short, not very deeply incised. The caudal ray count in the available specimen is 13, but the ordinary number of 16 is given by Agassiz.

The genus *Rhinelepis* has usually been separated from *Plecostomus* by the lack of an adipose fin. There are, however, a number of more valid, if less easily observed, characters separating the two genera.

Of the species attributed to *Rhinelepis*, Regan in 1904 showed that *Rhinelepis lophophanes* Eig. & Eig. belonged to the Hypoptopomatinae. *R. parahybae* Steindachner is made the type of the genus *Pogonopomoides* in the present paper. *R. agassizii* Steindachner seems to be a *Canthopomus*. *Rhinolepis* (sic) *paraguensis* Borodin is not a *Rhinelepis*, but it has been described in such a manner as to leave even its subfamily relationships a mystery. *Plecostomus* (*Rhinelepis*) *microps* R. von Ihering (non *Plecostomus microps* Steindachner), renamed *Rhinelepis rudolphi*

by A. de Miranda Ribeiro, has been made the type of a new genus, *Pareiorhina*, in the present paper. *R. levis* Pearson (1924, Indiana Univ. Studies, vol. 11, no. 64, p. 22) seems to be a perfectly normal *Plecostomus*, but without an adipose.

The genus remains then with two described forms, *Rhinelepis aspera* Agassiz and *Rhinelepis strigosa* Cuv. & Val. Regan considers the two species to be the same, but the present author would prefer to consider them distinct until sufficient material is accumulated to settle the question.

XI. *POGONOPOMA* Regan

Pogonopoma Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 205 (genotype subsequently designated by Eigenmann *Plecostomus wertheimeri* Steindachner).

The following generic description is based on Steindachner's account (1867, *Sitz. Kais. Akad. Wiss. Wien*, vol. 55, p. 701).

Head not particularly flattened; eyes moderate. Top of head granular to its margin. Cheek with bristles. A series of 3 enlarged plates running forwards from eye. Supracleithral plate bordered posteroventrally by a few small platelets, but also apparently in contact with the upper anterior edge of the exposed cleithrum. Teeth with a small lateral lobe; over 100 teeth on one side of either jaw. Mandibular ramus contained about twice in interorbital. Gill openings restricted as in *Plecostomus*. Barbel well developed, about equal to eye, the granulations of the upper lip not nearly reaching its base. Supraoccipital short and blunt, followed by 3, azygous, plus a well-developed predorsal plate. Scutes 22 in a lateral series.

Cleithrum extending backwards over base of pectoral spine. Ventral insertion somewhat behind dorsal insertion. Belly with one or more series of well-developed, transversely elongate plates lying along the base of the lateral scutes between ventral and pectoral bases, leaving the center of the belly naked. Smaller platelets lying at front of chest and behind ventral bases. Anal large, I 5, originating under last, depressed dorsal ray. Caudal moderate, lunate, with 16 principal rays.

One species, *Pogonopoma wertheimeri* (Steindachner) (1867, loc. cit.), from the Rio Mucuri, State of Bahia.

XII. *POGONOPOMOIDES* new genus

Type: *Rhinelepis parahybae* Steindachner.

Pogonopomoides is erected here for the single known species *Pogonopomoides parahybae* (Steindachner). This species is superficially quite closely related to *Pogonopoma wertheimeri*. The two genera differ in no single character which, in the author's opinion, would merit generic separation. However there seem to be at least four characters separating the two forms, which, taken together, would appear to validate such a procedure. These characters are: a small adipose fin is present in *Pogonopoma* and absent in *Pogonopomoides;* cheek bristles are present in *Pogonopoma* and absent in *Pogonopomoides;* there are about 22 scutes in a lateral series in *Pogonopoma* and about 26 in *Pogonopomoides;* lastly, the supracleithral plate in *Pogonopoma* (in Steindachner's plate) appears to be bordered posteroventrally by 4 small platelets and partly by the lst lateral scute, while in *Pogonopomoides* the supracleithral plate is bordered posteroventrally by numerous platelets and is nowhere in contact with the lst lateral scute.

The above, and the following description of *Pogonopomoides* are based on a specimen from the Rio Paraíba do Sul 340 mm in total length. (M. N. 4278)

Head apparently much as in *Pogonopoma*, except that there are no cheek bristles and that the supraoccipital tapers backwards to a sharp, elongate point. Tip of snout without any small naked area. Teeth with a small lateral lobe, about 70 on one side of either jaw. Mandibular ramus contained about twice in interorbital. Predorsal plate (text figs. 6 and 7), gill openings, barbel, and granulations of upper lip as in *Pogonopoma*. Scutes 25 or 26.

Cleithrum, ventral insertion, plating of belly, anal, and caudal as in *Pogonopoma*. Posterior section of air bladder well developed. Intestine with over 30 coils.

Pogonopomoides parahybae (Steindachner)

Rhinelepis parahybae Steindachner, 1878, Sitz. Kais. Akad. Wiss. Wien, vol. 77, p. 218, pl. 4 (Rio Paraíba do Sul) [not seen]; Eig. & Eig., 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 415 (Rio Pa-

raíba do Sul); A. de Miranda Ribeiro, 1911. Arch. Mus. Nac., vol. 16, p. 82, fig. 54 (Rio Paraíba do Sul).

Plecostomus parahybae Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 219 (Rio Paraíba do Sul).

The papers recorded above, plus Steindachner's plate, make further description of this species superfluous.

This fish has been more or less automatically placed in the genus (subgenus in Regan, 1904) *Rhinelepis* because of the absence of the adipose fin and the absence of cheek spines. Neither of these characters, however easy they may be to use, seem of particular phyletic significance in this group, and a separation based on them, as, for example, that of Regan (1904, op. cit., p. 205), results in a very unnatural classification of this group of genera.

III. PRELIMINARY MATERIAL FOR A REVISION OF THE SOUTHEASTERN BRAZILIAN SPECIES OF *PLECOSTOMUS*

The present paper arose from an innocent attempt to identify some specimens of *Plecostomus* sent in by Dr. Otto Schubart from the Rio Mogi-Guaçu, State of São Paulo. When the literature on *Plecostomus* was checked, it was noticed that no less than seven species had been described from the Rio Piracicaba, a nearby and by no means large river in the same basin (Paraná) as the Mogi-Guaçu. The author was quite prepared to find several of these seven species synonyms. Examination of the status of these forms was made possible by further collections of *Plecostomus* sent in from both the Mogi-Guaçu and the Piracicaba by Dr. Schubart. As it turns out, the problem cannot be solved by merely throwing half of the Piracicaba forms into synonymy and recognizing the rest. Indeed the very fact that Regan, the greatest authority on, and monographer of, the Loricariidae, described or helped to describe all seven of these species might have indicated that this solution was too simple. In fact, the Southeastern Brazilian forms of the genus *Plecostomus* form the most difficult taxonomic problem the author has ever encountered.

Fortunately nomenclatorial difficulties have not been superimposed upon the zoological ones. With the exception of certain old descriptions and a comparatively few newer ones, most of the Southeastern Brazilian species of *Plecostomus* have been well described from specimens of adequate size.

The zoological difficulties may be classified under four heads. First, there is the size of the genus. Over 70 species of *Plecostomus* are now recognized, of which some 30 have been described from Southeastern Brazil. In a genus this large, the interspecific gaps are usually fairly well filled in, and the phylogenetic pattern fairly well obscured; *Plecostomus* is no exception in either respect. For this reason alone it is practically impossible to make a dichotomous key to the species that will work.

Second, *Plecostomus* is an extremely specialized genus, and most of its characters have become stereotyped. For example, there is no variation in any of the fin counts whatsoever, while the number of lateral scutes ranges only from 25 to about 33. Perhaps the greatest variation is shown in tooth number, but this is an impractical character except within very broad limits, for many or all of the teeth often have been lost. In qualitative characters the genus seems to be equally lacking, and the color is somewhat variable. The result is that very extensive use has necessarily been made of measurement ratios. But these vary with size, and of the ones used only that of the interorbital divided by the mandibular ramus was found to be approximately constant over normal adult size ranges. This means that fishes of approximately the same size must be compared, while the ratios for fishes under about 120 mm in total length are utterly useless.[17] Another problem that arises from the use of measurement ratios concerns the statistical and consequently taxonomic value of the range of such ratios. The range of a meristic count is a poor enough statistical character, but the range of a measurement ratio is worse. Yet the author, by the very nature of *Plecostomus*, has been more or less forced into the use of ranges of measurement ratios, both in the key and

[17] Specific names based on specimens under about 120 mm in total length can only be put to one side until collection of topotypic adults can be made. There seem to be no truly dwarf species of *Plecostomus*, the smallest known to the author, *P. paulinus*, reaching a standard length of at least 145 mm.

throughout the paper. It must therefore be understood at the start that these ranges, based on a few specimens in each case, are in no sense the range in the population of that species; rather they are, even those in the key, given as guides to species and are not expected to include every specimen of that species found.

Third, the area treated by this paper is cut up by numerous major and minor discrete and fairly old watersheds. The fishes of these different watersheds are in many cases on their way towards, or have arrived at, complete speciation. What stage of the process they are in can be determined only by large collections from a great number of localities.

Last, there is the problem presented by the seven described species from one small river. None of these seven are obvious synonyms; that is, they seem to form more or less clearly differentiable entities in the material collected by Schubart. Furthermore, if one of these seven species is placed in synonymy, there is no logical stopping point in the process until we end with one or two protean species. Yet to recognize seven species of *Plecostomus* from the Piracicaba seems somewhat odd when only eight have been recorded from the Amazon basin. The author earlier felt that the problem of the species in the Rio Piracicaba could be solved by examining a few hundred specimens, but having made this examination is now convinced that the answer lies deeper. Indeed the problem seems to belong more in the field of speciational dynamics than in that of taxonomic statics.

In short, the difficulties encountered are such that the present paper can make no pretense towards being a definitive contribution. Rather its aim is to gather the described Southeastern Brazilian forms out of the scattered literature, to define them and compare their interrelationships as far as can be done on the basis of available material, and to point out the difficulties encountered. The problem of how many of the forms here dealt with actually represent valid species and how many, for example, are merely geographic variations has been left largely to the future. The author feels that to try to solve this problem on the basis of the collections at hand would serve no purpose. [18]

The paper's rather limited aims have resulted in a somewhat specialized taxonomic procedure. First, new, well-preserved specimens have been used as far as possible, and all measurements are based on these. Experience has shown that old, colorless specimens can often be identified with the help of new material but alone are of little use as a basis of classification. Even the reexamination of an old holotype in this genus can be surprisingly fruitless unless one knows fairly well beforehand what one is looking for. Second, in an effort to avoid creating more problems where enough exist already, the author has been extremely conservative about proposing new names. For essentially the same reason no attempt has been made to introduce trinomials. It is the author's opinion that if, as in the present group, the species cannot even be defined, there is little use in trying to define subspecies; in any case the named subspecies with which this paper will have to deal are hopelessly unidentifiable either as to subspecies or as to species. On the other hand, a general lumping of different forms under one species description is of no value. Even so astute an observer as Regan has given at least two composite descriptions, e. g. *P. latirostris* and *P. auroguttatus*, in his 1904 monograph, and the result is that these descriptions are of little value. In the present paper, where two or more separable forms are provisionally considered to represent a single species, these forms will be described separately, the problem of the validity and naming of these forms being left to future work based on more adequate collections.

The area treated here includes the Rio São Francisco basin, the Brazilian coastal watersheds to the south, and the Paraná ba-

[18] The taxonomist trying to identify a specimen of *Plecostomus* will probably feel disgruntled to find himself presented with a problem rather than a name. But it is perhaps worth asking whether it would have improved this paper to have given the identifier a definite answer, but one which would surely have to be altered later? The author feels that at least a temporary shift in emphasis from the naming of specimens to the working out of the problems of taxonomy of Brazilian fishes is in order. Specific names, to be the fundamental tools to all biological work that they are, must be more or less valid. It is the author's personal opinion that the limits of specific variation in any of the large South American fresh-water fish genera outside of the Tetragonopterinae are so poorly known as to make any specific determination within these genera provisional at best. Another personal opinion is that recognition of this situation would help to remedy it.

sin. Some attention must naturally be paid also to the species of *Plecostomus* described from the Rios Araguaia and Paraguay just beyond this area. Though the paper concerns itself with the whole of Southeastern Brazil, it deals chiefly with those few areas from which specimens have been available. Likewise the treatment of the different sections of the genus varies with the adequacy of the material. Lack of specimens has made it necessary to treat the species surrounding *P. commersonii* and those around *P. wuchereri* as groups. With these exceptions, and that of *P. lacerta* Nichols and *P. obtusirostris* Steindachner which seem to belong in other genera, all the described species of *Plecostomus* from Southeastern Brazil have been taken up.

A particular effort has been made to obtain fishes from those localities from which species have previously been described. The author has been especially fortunate in obtaining from Dr. Otto Schubart, who was kindly allowed to use the facilities of the Estação Experimental de Caça e Pesca in Pirassununga, some 200 specimens of *Plecostomus* from the Rios Piracicaba and Mogi-Guaçu in São Paulo. Another important series of collections was received from Dr. Rafael Figueira and Mr. Enéas Nunes de Miranda from various points in the Paraíba do Sul basin in the States of Minas Gerais and Rio de Janeiro. A series of two species of *Plecostomus* collected by Dr. G. S. Myers and Mr. Antenor Carvalho on the Rio Iguaçu and other series collected by the same individuals with Mr. Paulo de Miranda Ribeiro on the Rio das Velhas and Rio São Francisco were made available. Finally, a series of *P. affinis*, collected by Prof. Lauro Travassos and Dr. Newton Santos, has been studied. The author sincerely wishes to thank all of these individuals. Also the author has had the opportunity of examining the Caça e Pesca, the Departamento de Zoologia (abbreviated as D. Z.), and the Museu Nacional (abbreviated as M. N.) collections, for which he wishes to thank Dr. Demócrito da Silva, Dr. Frederico Lane and Heloisa Alberto Torres, Director, respectively.

MEASUREMENTS AND COUNTS

Standard and total lengths (abbreviated as S. L. and T. L.) were measured to the nearest mm by laying the ventral surface of the fish along a mm rule. All other measurements were made, usually to the nearest 0.1 mm, by means of an ordinary pair of calipers.

Total length was taken to the tip of the lowest caudal ray; standard length was measured to the posterior border of the last lateral scute, i. e. the last vertically elongate scute. Head was measured, except when otherwise stated, to the end of the supraoccipital plate (which is about the same as the distance to the end of the supratemporal plate used by Regan, 1904). The snout was taken to the front of the bony orbit (and consequently does not correspond to Regan's Loricariid snout measurements). Interorbital is the bony interorbital. The eye, however, was measured between the fleshy, not the bony, orbital rims. The length of the mandibular ramus is the length of the tooth-bearing section of one side of the lower jaw. The snout-dorsal distance is that between tip of snout and front of base of dorsal spine. Dorsal-adipose distance was measured from the back of the base of the last dorsal ray to the most forward point at which the adipose spine emerges from the body plating. Fin rays were straightened for measurement. The length of the caudal peduncle was taken from the base of the last anal ray to the posterior end of the last lateral scute.

As a crude test on reliability, all measurements were made twice on six fishes. The results may be stated as follows in descending order of reliability: interorbital, depth of caudal peduncle, head length, pectoral length, snout-dorsal distance, width of head, and length of caudal peduncle with average discrepancy between measurement pairs of less than 1% of the measurement; snout, orbit-dorsal distance, adipose spine, length of dorsal spine, dorsal base, ventral spine, and dorsal-adipose distance with average discrepancy between 1 and 2%; and mandibular ramus, depth of body, eye, and depth of head with average discrepancy between 2.5 and 4.4%.

The first ray of all fins except the caudal has been called a spine. Lateral scutes were counted in the lowermost continuous series. The first lateral scute is the first scute behind the exposed bony plate which forms an upward extension of the pectoral girdle

Tooth counts are for one side of a jaw; they are hard to make accurately because the teeth often align themselves in such a way that one tooth partially obscures another. For this reason, and because of missing teeth, the tooth counts tend to be too low.

If significant sexual variation is present in *Plecostomus*, it has not been found. Those specimens examined during the course of the present work were not ripe.

1. *Plecostomus albopunctatus* Regan (Plate 4, fig. 7)

Plecostomus albopunctatus Regan, 1907, Proc. Zool. Soc. London for 1907, p. 797, pl. 49, fig. 1 (Rio Piracicaba, State of São Paulo).

Plecostomus lexi R. von Ihering, 1911, Rev. Mus. Paulista, vol. 8, p. 387 (Rio Pardo, near Barretos, State of São Paulo).

Plecostomus niger Marini, Nichols & La Monte, 1933, Amer. Mus. Novitates no. 618, p. 4 (Southeastern Brazil).

Material examined: Rio Pardo, near Barretos, São Paulo — D. Z. 22126, one specimen, 355 mm in S. L. (type of *P. lexi*); Rio Piracicaba, below Piracicaba — 22 specimens, 66-210 mm S. L. and 87-268 mm T. L., coll. by O. Schubart, May 22, 1945 (M. N. 4246); Rio Mogi-Guaçu — 10 specimens, 97-264 mm S. L. & 130-335 mm T. L., coll. O. Schubart, June-July, 1944 (M. N. 4247); Rio Camanducaia, at Monte Alegre, São Paulo — D. Z. 3370, 6 specimens, 134-232 mm S. L., coll. J. L. Lima, Jan.-Feb., 1943; Macaé, State of Rio de Janeiro — M. N. 914, one specimen, 208 mm S. L., coll. E. Garbe.

This species seems to be one of the most distinct in the genus. It is the only species which has the ventrals equal to or longer than the pectorals. The extremely small eye, the long snout, the short dorsal rays, and the short adipose are other distinguishing features.

The measurement ratios and counts, with averages, for some of the above specimens are given in Table IV.

P. albopunctatus is a flat species with a long and broad snout, the anterior nostril being about equidistant from the tip of snout and tip of supraoccipital. The eye is small and set far back in the head. The supraorbitals and supraoccipital have low, rounded ridges. In the specimens at hand the supraoccipital is usually bordered by a single scute, but this scute often breaks up irregularly into two or three. The whole area between the supraoccipital and the dorsal seems to be prone to irregularities in scute arrangement. The scutes of this species are without carinae, and the bottom of the caudal peduncle is only slightly flattened. Belly and bottom of head completely plated except for small areas at pectoral and ventral bases in specimens as small as 125 mm S. L. The relative lengths of the fins of this species are different than in most other *Plecostomus*. The dorsal, adipose, and pectoral spines are comparatively short and the ventral and anal unusually long; in fact, in 32 specimens from the Piracicaba and Mogi-Guaçu the ventral spines are longer than the dorsal spine in all cases and equal to or longer than the pectoral spines in all but two cases. The longest, lowermost caudal ray is slightly shorter than or about equal to head; the caudal outline is moderately concave with the shortest ray 2/3-3/4 the length of the uppermost ray.

P. albopunctatus has a slaty-black ground color. On this, light markings, sometimes faint, seem always to be superimposed. The most common pattern appears to be that of small to moderate whitish spots on the head, body, and fins. A reticulate pattern is not uncommon among large specimens, and is shown in the specimen photographed in Plate 4. When this occurs, the spots of the whole or only the back of the head and those of the fore part of the body unite to form vermiculations. In the rear of the body, however, the spots unite to form straight, horizontal lines, one per scute row. In the reticulate patterned individuals, the fins are not notably marked.

The distinguishing features of *P. albopunctatus* are so well marked and so constant that, in spite of considerable variation in other characters, the present author has little doubt about either the identification of the specimens here described or about placing *P. niger* and *P. lexi* in synonymy. Table IV shows no serious variations anywhere. *P. albopunctatus*, *P. lexi*, and *P. niger* all seem to have been described from the spotted phase.

Table IV. Measurement Ratios and Counts for P. albopunctatus

	P. ALBOPUNCTATUS	PLECOSTOMUS LEXI		P. NIGER	PLECOSTOMUS ALBOPUNCTATUS			
	ORIGINAL DESCRIPTION	ORIGINAL DESCRIPTION		ORIGINAL DESCRIPTION				
Locality	Rio Piracicaba	Rio Pardo		S. E. Brazil	Rio Piracicaba	Rio Camanducaia	Rio Mogi-Guaçu	Macaé
Cat. No.			D. Z. 2.2.126	A.M.N.H.12245	M. N. 4246	D. Z. 3370	M. N. 4247	M. N. 914
No. of specimens	2	1	1	1	5	6	5	1
S. L. (mm)	(174–220 T. L.)	(460 T. L.)	ca. 355	245	130–210 (156)	134–232 (165)	146–264 (211)	208
D[a]. in S. L.	5 ½–6		4.80	6	5.29–6.27 (5.86)	4.77–5.90 (5.18)	4.83–5.11 (4.95)	5.73
H. in S. L.	3–3 1/4	3 1/2	3.14	3	2.89–3.15 (3.00)	2.79–3.14 (2.95)	2.79–3.12 (3.00)	2.97
W. of H. in H.	1 1/10	almost = H.	1.05	1.2	1.05–1.11 (1.08)	1.09–1.11 (1.10)	1.05–1.13 (1.09)	1.09
Interorb. in H.	3–3 1/5	almost 3 1/2	3.22	3	3.09–3.50 (3.21)	2.99–3.10 (3.05)	2.92–3.09 (3.01)	3.00
Sn. in H.			1.40	1.4	1.45–1.53 (1.49)	1.41–1.48 (1.43)	1.42–1.56 (1.47)	1.44
Eye in H.	9–10	almost 9	10.3	9.5	8.9–10.7 (9.6)	8.2–10.1 (9.2)	8.7–12.1 (10.6)	9.9
Mand. ram. in Interorb.	1 1/2–1 3/4	2 1/5	2.14	1.9	1.57–1.91 (1.77)	1.70–2.15 (1.81)	1.86–2.12 (2.00)	1.99
Sn.-dor. in S. L.			2.18		2.25–2.41 (2.32)	2.16–2.35 (2.28)	2.19–2.37 (2.29)	2.35
Dor. base in Sn.-dor.			2.09	(1.6 in H.)	1.82–2.02 (1.92)	2.03–2.15 (2.08)	1.87–2.03 (1.94)	2.07
Dor.-ad. in Sn.-dor.			2.23	(1.6 in H.)	2.06–2.56 (2.40)	1.85–2.42 (2.25)	2.24–2.48 (2.36)	2.16
Ad. spine in Dor.-ad.			2.84		2.00–3.00 (2.56)	2.29–4.15 (3.06)	2.27–2.78 (2.52)	3.12
Dor. spine in Sn.-dor.	(3/5-more than 2/3 of H.)	(1 eye dia. less than H.)	1.70	(1.5 in H.)	1.80–1.86 (1.83)	1.74–1.90 (1.83)	1.6–1.7 ③ b	1.76
Pect. spine in Sn.-dor.		(= H.)	1.51	(1.4 in H.)	1.64–1.74 (1.69)	1.70–2.02 (1.82)	1.45–1.71 (1.58)	1.56
D. of Caud. P. in L. of Caud. P.	2 1/2	little less than 3	2.46		2.45–2.69 (2.59)	2.66–2.91 (2.75)	2.43–2.79 (2.63)	2.71
Teeth	26–32 / 22–26		32 / 33	/ ca. 26	25–36 (30) / 25–33 (28)	21–31 (27) / 22–33 (28)	32–40 (35) / 29–39 (33)	34 / 33
Scutes	26	25	25&26	27	26	26 ③–27 ③	26	26 & 27
Sc. bordering supraoc.	1	3 irreg.	2	2	1 ③–1 divided ②	1	1 ④–2 ①	2

a) D. = depth; H. = head; W. = width; Interorb. = interorbital; Sn. = snout; Mand. ram. = mandibular ramus; Dor. = dorsal; Ad. = adipose; Pect. = pectoral; Vent. = ventral; Caud. P. = caudal peduncle. L. = length; Sc. = scutes; bet. = between; supraoc. = supraoccipital; dia. = diameter; irreg. = irregular; ca. = about.

b) A circled figure indicates number of specimens when the number differs from that given at head of column.

2. *Plecostomus latirostris* Regan

Plecostomus latirostris Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 213 (partim), pl. 11, fig. 1 (Rio Jungada, State of Mato Grosso).

The description of *P. latirostris* cited above is a composite of this species and *P. goyazensis*. Not seen. Apparently closely allied to, if not identical with, the following species.

3. *Plecostomus ternetzi* Boulenger

Plecostomus ternetzi Boulenger, 1895, Proc. Zool. Soc. London for 1895, p. 525, and 1896, Trans. Zool. Soc. London, vol. 14, p. 30, pl. 5 (Paraguay); Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 214 (on the type).

Not seen. This and *P. latirostris* seem to be the shortest, stubbiest fishes in the genus.

4. *Plecostomus paulinus* R. von Ihering (Plate 4, fig. 8)

Plecostomus paulinus R. von Ihering, 1905, Ann. Mag. Nat. Hist., ser. 7, vol. 15, p. 560 (Rio Piracicaba, State of São Paulo).

Material examined: Rio Piracicaba — M. N. 862, 3 specimens, 96-128 mm S. L., coll. R. von Ihering and J. Lima (these specimens are presumably part of the collection from which the holotype, now in the British Museum, was chosen); Rio Piracicaba, below Piracicaba — 9 specimens, 45-90 mm S. L., coll. O. Schubart, May 22, 1945 (M. N. 4249); Rio Mogi-Guaçu, below Pirassununga — 2 specimens, 110 & 145 mm S. L., coll. G. S. Myers, H. Rosa, & A. Carvalho, March 25, 1944 (M. N. 4277); 2 specimens, 60 & 75 mm S. L., O. Schubart (M. N. 4250); one specimen, 111 mm S. L., O. Schubart, March 27, 1944; 9 specimens, 74-130 mm S. L., O. Schubart, June-July, 1944 (M. N. 4248).

The largest known specimen of this species is one of those examined, 145 mm in standard length and about 180 mm over all. In comparison with other Southeastern Brazilian forms, *P. paulinus* gives the appearance of being a rather overcalcified, short-finned dwarf of rather high variability.

Measurement ratios and counts for this species are given in Table V.

The head and body of *P. paulinus* are flat and broad. The caudal peduncle is definitely flattened below. A raised supraocular ridge may be present or not; supraoccipital not ridged. In 14 specimens of this species, the supraoccipital is bordered by one scute in eleven cases, by two once, and by three scutes

Table V. Measurement Ratios and Counts for P. paulinus

	ORIGINAL DESCRIPTION		
Locality	Piracicaba	Piracicaba	Mogi-Guaçú
Cat. No.		D.Z.156 M. N. 862	M. N. 4248
No. of specimens	1	3	5
S. L. (mm)	(160 T. L.)	96–128 (108)	104–130 (113)
D. in S. L.	5 1/4	5.01–6.27 (5.47)	5.20–5.82 (5.52)
H. in S. L.	3 1/3	3.07–3.35 (3.17)	2.90–3.26 (3.06)
W. of H. in H.	nearly 1	1.01–1.06 (1.04)	1.01–1.09 (1.06)
D. of H. in H.	1 4/5	1.72–1.97 (1.85)	1.87–2.03 (1.93)
Interorb. in H.	3	2.80–2.96 (2.86)	2.77–3.05 (2.95)
Sn. in H.		1.54–1.65 (1.60)	1.53–1.64 (1.58)
Eye in H.	6	5. 5–6. 1 (5. 7)	6. 2–7. 1 (6. 5)
Eye in Interorb.		1.85–2.16 (2.01)	2.03–2.37 (2.19)
Mandl. ram. in Interorb.	1 2/5	1.61–1.87 (1.74)	1.56–2.03 (1.70)
Sn.–dor. in S. L.		2.38–2.45 (2.41)	2.25–2.47 (2.36)
Dor. base in Sn.–dor.		1.57–1.62 (1.60)	1.58–1.82 (1.72)
Dor.– ad. in Sn.–dor.		2.36–2.65 (2.47)	2.31–3.09 (2.70)
Ad. spine in Dor.–ad.		1.72–2.38 (2.05)	1. 6–2. 7④ (1. 9)④
Dor. spine in Sn.–dor.	(5/6 of H.)	1.72–1.83 (1.76)	1.71–1.81 (1.75)
Pect. spine in Sn.–dor.			
D. of Caud. P. in L. of Caud. P.	3	1.41–1.48 (1.44) 2.95–3.05 (2.98)	1.47–1.87 (1.69) 2.65–3.38 (2.96)
Teeth		50–63 (56) 46–52② (49,②)	38–54 (49,) 47–64 (55,)
Scutes	25	25–③ 26①	25–27 (25.8

twice. Barbel short, about 1/3 of the eye diameter in length. Scutes unusually spiny, not carinate. Pectoral spines with well-developed hooklets in a specimen 100 mm in S. L. Belly apparently never completely plated, comparatively large irregular plates across the front of chest and along sides of belly; one specimen with a narrow incompletely plated area down the center of the abdomen. Abdominal plating developing in a specimen 100 mm in S. L. Pectorals significantly longer than ventrals and reaching about 1/4 of the way along them, ventrals to slightly beyond anal origin. Caudal short and little concave, the longest, lowermost ray equal to or less than the head length and the shortest about 4/5 as long as the uppermost ray.

The basic body color of this species is gray-black. The fish may be either uniform or light-spotted or light-spotted and reticulated. The light markings when present are most prominent on the head, extending in decreasing intensity onto the body and fins. In one specimen the spotting of the interorbital and temporal regions has fused to form lines and vermiculations.

Of the seven species of *Plecostomus* described from the Rio Piracicaba, the specimens here considered could belong only to *P. paulinus*. There is only one point at which the present specimens disagree seriously with the description of *P. paulinus*. In the specimens at hand the interorbital/mandibular ramus ratio varies from 1.6 to 2.0; in the description this ratio is given as 1.4.

The species may at once be separated from all others of the genus except *P. albopunctatus* by the short dorsal spine. From *P. albopunctatus* it may be differentiated by the different pectoral-ventral size relationship and by the larger eye and shorter snout. All the specimens of this species over 120 mm in standard length are readily distinguishable from other species of *Plecostomus*. They do not seem to be closely related to any particular species, with the possible exception of *P. myersi*.

Though there seem to be certain minor distinctions between the Piracicaba and Mogi-Guaçu specimens, these would seem insignificant in view of the great individual variation.

5. **Plecostomus myersi** new species (Plate 5, figs. 9 and 10)

Holotype: 182 mm in S. L., 247 mm in T. L., from the Rio Iguaçu at Porto União, State of Paraná, coll. by G. S. Myers and A. Carvalho, April 21-25, 1944 (M. N. 4251).

Paratypes: four; 129-207 mm S. L., 175-277 mm T. L., coll. with the holotype (2 in M. N. 4252 and 2 sent to Stanford University, California, U. S. A.).

This species, in its general asperity and especially in the abdominal plating, resembles *P. paulinus*. It is, however, a much more normal appearing fish.

Measurements, measurement ratios, and counts for the five examples are given in Table VI.

Head rather broad, not especially depressed. Caudal peduncle flat below. Supraorbitals and supraoccipital very slightly raised. Supraoccipital bordered posteriorly by a single scute, which shows uncompleted subdivision only in the holotype. Barbel rather well-developed, about 2/3 the diameter of the eye in length. Scutes showing some tendency towards carination in the upper two lateral series. All of the scutes, the head, and the pectoral spines unusually prickly, the spinelets on the scutes arranging themselves in horizontal, sometimes radiating rows. Pectoral spines with outer 2/3 prickly, the prickles well-developed in the smallest specimen.

Belly in the holotype plated except for a wide area surrounding each ventral base. The largest specimen, however, has bands of plates at bases of lateral scutes, across front of chest, and down the center of belly about to the level of the ventral bases; also a patch of plates in front of anus. Smallest specimen with isolated plates or groups of plates in these same areas, the largest groups being those at bases of lateral scutes.

Pectorals reaching about 1/3 of the way along ventrals, ventrals about to end of anal base. Caudal rather deeply concave, but not very oblique; lowest caudal ray about equal to head; shortest caudal ray about 2/3 the length of the uppermost.

The ground color of this fish is steel-gray. In four specimens the head and body are covered with whitish punctulations; in the fifth specimen the fore part of the body

Table VI. Measurements, Measurement Ratios, and Counts for P. myersi

T. L.	277 mm		247 mm		205 mm		184 mm		175 mm	
S. L.	207		182		154		139		129	
D. (in S. L.)	45.2	(4.58)	35.1	(5.18)	32.7	(4.71)	28.2	(4.93)	23.7	(5.45)
H. (in S. L.)	64.8	(3.20)	59.0	(3.08)	47.9	(3.21)	45.3	(3.07)	41.9	(3.08)
H. to upper angle of gill opening (in S. L.)	53.0	(3.91)	47.3	(3.85)	40.2	(3.83)	34.9	(3.98)	33.1	(3.90)
W. of H. (in H.)	61.2	(1.05)	53.1	(1.11)	45.1	(1.06)	41.6	(1.09)	39.8	(1.05)
D. of H. (in W. of H.)	39.7	(1.54)	34.9	(1.52)	31.3	(1.44)	26.7	(1.56)	23.4	(1.70)
Interorb. (in H.)	22.8	(2.84)	21.8	(2.70)	17.3	(2.77)	16.3	(2.78)	15.1	(2.78)
Sn. (in H.)	43.3	(1.49)	38.0	(1.55)	31.5	(1.52)	27.5	(1.64)	26.1	(1.60)
Eye (in H.)	7.3	(8.9)	7.5	(7.9)	6.9	(6.9)	6.3	(7.2)	6.0	(7.6)
Mand. ram. (in Interorb.)	13.0	(1.75)	11.8	(1.85)	9.4	(1.84)	9.1	(1.79)	9.0	(1.68)
Sn.-dor. (in S. L.)	86.3	(2.40)	75.5	(2.41)	63.0	(2.45)	57.7	(2.41)	54.0	(2.39)
Orbit-dor.	40.0		35.9		29.6		26.9		25.9	
Dor–base	55.0		49.1		39.4		36.1		33.9	
Dor.-ad. (in Sn.-dor.)	36.3	(2.38)	27.0	(2.79)	25.9	(2.43)	21.0	(2.75)	20.4	(2.64)
Ad. spine (in Dor.-ad.)	20.2	(1.80)	19.0	(1.42)	15.4	(1.68)	13.2	(1.59)	13.5	(1.51)
Dor. spine (in Sn.-dor.)	57.2	(1.51)	53.7	(1.40)	43.4	(1.45)	37.3	(1.55)	38.1	(1.42)
Pect. spine (in Sn.-dor.)	62.7	(1.37)	57.0	(1.32)	46.0	(1.37)	41.0	(1.41)	41.0	(1.32)
Vent. spine (in Sn.-dor.)	51.0	(1.69)	46.7	(1.61)	39.6	(1.59)	33.7	(1.71)	33.8	(1.60)
Last dor. ray	32.1		27.6		21.9		19.3		20.0	
D. of Caud. P. (in L. of Caud. P.)	19.7	(3.24)	18.0	(3.21)	15.3	(3.12)	13.4	(3.28)	13.2	(2.98)
L. of Caud. P.	64.0		57.8		47.7		44.0		39.3	
Scutes	26		25		26		26		26	
Sc. between Anal & Caud.	13		12		13		13		12	
Sc. between Dor. & Ad.	7		6		6		6		6	
Teeth	49		56		50		?		47	
	61		62		56		46		57	

is marked with predominantly vertical, irregular light lines. The dorsal fin has light punctulations on the outer part of the rays and interradial membranes; there tends to be an irregular light line running down the basal half of each interradial membrane. Other fins with light punctulations which only occasionally tend to form lines. The belly seems to be mottled in those areas where plates have developed.

This species, aside perhaps from *P. paulinus*, does not seem to have particularly close relatives. From *P. paulinus* it can at once be distinguished by the longer dorsal spine. In the number of teeth and the length of the mandibular ramus it, like *P. paulinus*, rather falls between the *P. auroguttatus-strigaticeps* and the *P. hermanni-variipictus* groups.

The species has been named for the senior collector, to whom the present author is indebted for a large part of what knowledge he may have acquired in the field of South American ichthyology.

6. *Plecostomus auroguttatus* (Kner)

Hypostomus auroguttatus Kner, 1854, Denkschr. Kais. Akad. Wiss. Wien, vol. 7, p. 269, pl. 2, fig. 3 (Kner's type said by Steindachner, 1882, to have been taken in the Rio Paraíba do Sul).

Plecostomus auroguttatus Steindachner, 1882, Denkschr. Kais. Akad. Wiss. Wien, vol. 44, p. 6 (vicinity of Rio de Janeiro).

Plecostomus auroguttatus Regan (partim), 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 217 (Eastern Brazil).

Of the species here identified as *P. auroguttatus*, the following specimens have been examined: Rio São Francisco, at Pirapora — 2 specimens, 136 & 203 mm S. L., coll. J. Bailey & A. Carvalho, Feb. 12, 1942 (M. N. 3800); 10 specimens, 72-137 mm S. L., coll. G. S. Myers, P. Miranda-Ribeiro, & A. Carvalho, Oct., 1942 (5 in M. N. 4253 and 5 sent to Stanford University, California, U. S. A.).

This species is especially notable for the broad mandibular ramus, which is contained 1.5 or fewer times in the interorbital width. The specimens here identified as *P. auroguttatus* resemble *P. asperatus* in general shape, but are at once distinguishable because of the larger eye and shorter snout.

The measurement ratios and counts are given in Table VII.

Head broad, flat. Caudal peduncle definitely flattened below. Supraorbitals and su-

praoccipital slightly ridged. Supraoccipital bordered posteriorly by a single scute, which is at times irregularly subdivided into two or three. Barbel well-developed, equal to about 2/3 the eye diameter. Scutes not carinate. Belly with a naked area between and behind ventrals except for a narrow central line of platelets. Pectoral spines with well-developed hooks only in the largest specimen, reaching 1/3-3/5 of the way along the ventrals, which in turn reach beyond the anal origin. Lowest caudal ray somewhat longer than head; shortest caudal ray about 2/3 the uppermost ray.

Specimens faded brown, but usually retaining rather regular, six-sided reticulations on head and pectorals. Dorsal interradial membranes plain or with dark blotches divided by wavy light lines. Sides of body in largest specimen with traces of light spots.

These specimens agree with Kner's original description and plate in almost every detail. Though Kner gave no locality, Steindachner in 1882 stated that Kner's type was definitely from the Rio Paraíba do Sul. At the same time Steindachner described another specimen of *P. auroguttatus* from the vicinity of Rio de Janeiro which agrees well enough with Kner's description.

In an effort to check *P. auroguttatus* the present author, through the help of Dr. Rafael Figueira, Mr. Enéas Nunes de Miranda, and Mr. J. Young, has been able to obtain some hundred specimens of *Plecostomus* from several points in the upper Rio Paraíba do Sul basin. However, nothing resembling *P. auroguttatus* was found.

This species as defined above has the broadest mandibular ramus of any *Plecostomus* in Southeastern Brazil. Though occasional specimens of other forms may overlap the range of *P. auroguttatus*, all but two of these have a shorter, deeper caudal peduncle and a larger head/interorbital ratio. Of these two, *P. asperatus* may be distinguished by the smaller eye and shorter dorsal spine. The one remaining form is described below.

Specimens examined: Rio Camanducaia, tributary to Rio Piracicaba, at Monte Alegre — D. Z. 3191, 6 specimens, 139-186 mm S. L., coll. J. Lima, Aug. 5, 1942.

Measurement ratios and counts given in Table VII.

Scutes moderately ridged. Supraorbitals slightly raised. Supraoccipital bordered posteriorly by a single scute.

Numerous light spots on head; larger light spots on fins and body, about 3 per body scute; posterior part of each dorsal interradial membrane dark with a few light spots, anterior part lighter, unspotted; pectoral, ventral, and caudal rays with light spots extending onto the interradial membranes.

This Camanducaia form has been placed here because of its resemblance to *P. auroguttatus* in the rather elongate caudal peduncle and the narrow interorbital as well as in the broad mandibular ramus. In all these characters, however, besides overlapping *P. auroguttatus*, the Camanducaia form fills in the gap between *P. auroguttatus* and the form here called *P. strigaticeps*, while the color is entirely that of *P. strigaticeps*. In the length of the adipose spine and the dorsal-adipose distance, however, it is very distinct from either.

It would seem that with seven species described from the Piracicaba the Camanducaia fishes could be identified with one of them. However, they appear to be at least as close to *P. auroguttatus* as to any described Piracicaba species. The identification of this form with *P. auroguttatus* is, however, entirely provisional.

7. *Plecostomus strigaticeps* Regan (Plate 6, fig. 11)

Plecostomus strigaticeps Regan, 1907, Proc. Zool. Soc. London for 1907, p. 796, pl. 48, fig. 1 (Rio Piracicaba, State of São Paulo).

Plecostomus meleagris Marini, Nichols, & La Monte, 1933, Amer. Mus. Novitates no. 618, p. 4 (Southeastern Brazil).

With considerable hesitation the above synonymy has been adopted for what seems to be one of the commonest species of *Plecostomus* from the Piracicaba and Mogi-Guaçu.

Material examined: Rio Piracicaba — M. N. 1019 (partim), one specimen, 184 mm S. L., coll. R. von Ihering & Lima; D. Z. 2116 (partim), one specimen, 197 mm S. L., coll. R. von Ihering, 1906; D. Z. 3097, 2 specimens, 113 & 121 mm S. L., coll. 1942; M. N. 1017, one specimen, 180 mm S. L.; Rio Pi-

racicaba, below Piracicaba — 9 specimens, 143-236 mm S. L., 185-300 mm T. L., coll. O. Schubart, May 22, 1945 (M. N. 4258); Franca, São Paulo — M. N. 872 (partim), one specimen, 182 mm S. L., coll. E. Garbe; Castro, Paraná — D. Z. 2142, one specimen, 186 mm S. L.; Rio Mogi-Guaçu, below Pirassununga — 6 specimens, 50-82 mm S. L. (M. N. 4256); 6 specimens, 68-111 mm S. L., 86-152 mm T. L., coll. G. S. Myers, A. Carvalho, & H. Rosa, March 27, 1944 (3 in M. N. 4254 and 3 sent to Stanford University, California, U. S. A.); 2 specimens, 174 & 230 mm S. L., 233 & 297 mm T. L., coll. O. Schubart, 1941-1942 (M. N. 4255); 26 specimens, coll. O. Schubart, June-July, 1944 (M. N. 4257).

This species so far as can be seen has no very distinctive characters. Measurement ratios and counts are given in Table VII.

The head is broad and flattened but not unusually so for this group. Supraorbitals and supraoccipital with low, rounded ridges. Supraoccipital almost invariably followed by a single, undivided scute. Barbel moderately well-developed, equal in length to about half an eye diameter. Scutes not carinate. Belly almost completely plated in specimens 140 mm in S. L. Pectoral spines with well-developed hooklets only in specimens of 220 mm or more in S. L., reaching about 1/2 of the way along the ventrals, which in turn reach beyond anal origin. Caudal rather short and little concave, the lowermost caudal ray somewhat shorter than head; shortest caudal ray 3/4-4/5 the length of the uppermost.

Body slaty-black with striking yellowish or orange markings. These markings most often are in the form of spots on the head, body, and rays of all the fins. Frequently, however, the spots of the head, fore part of body, and pectorals merge to form reticulations.

The form here described was originally identified as *Plecostomus hermanni* R. von Ihering. This identification was finally decided against on the basis of two very insecure reasons. In the first place, von Ihering states the interorbital/mandibular ramus of *P. hermanni* to be 1 5/6; in the specimens measured here this ratio varies between 1.5 and 1.9, with an average of about 1 3/4. Secondly, *P. hermanni* is said to have "traces of dark spots on the upper surface of the head." It would seem difficult for even faded specimens of the form treated here to have anything that would give the impression of dark spots on the head.

In the identification of these fishes with *P. strigaticeps* on the other hand, the chief discrepancy is the somewhat larger eye size given in Regan's description. However, Regan's figure indicates a smaller eye than stated in his description. The chief point at which the form here described differs from the description of the holotype of *P. meleagris* is in the interorbital width, which is said to be 2.8 in head in *P. meleagris*. This is a little high but well within the range of variation of the Mogi-Guaçu specimens recorded here. However, the paratypes of *P. meleagris*, with the exception of the last specimen in the table which seems to be *P. regani*, have the head/interorbital ratio 2.8-3.0, which is about at an extreme of the range of the present author's specimens of *P. strigaticeps*.

P. strigaticeps, as here identified, overlaps the São Francisco specimens of *P. auroguttatus* in all but two characters. *P. strigaticeps*, however, tends to be a deeper fish, with a broader interorbital, somewhat shorter fins, and a deeper caudal peduncle.

From the Rio Camanducaia specimens identified here as *P. auroguttatus*, *P. strigaticeps* differs in the shorter dorsal-adipose distance and the longer adipose spine.

Of other described species with which this form might be identified, only *P. garmani* has an interorbital/mandibular ramus ratio of less than 1 5/6. But even *P. garmani* has this ratio rather too high (1 4/5), and the interorbital seems to be much too narrow (3 1/6 in head).

8. *Plecostomus asperatus* (Castelnau)

Plecostomus asperatus Castelnau, 1855, Anim. Amér. Sud, p. 41, pl. 20, fig. 2 (Rio Araguaia).

Plecostomus auroguttatus Regan (partim), 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 217.

Material examined: Rio São Francisco, at Pirapora — 20 specimens, 78-223 mm S. L., 105-287 mm T. L., coll. G. S. Myers, A. Carvalho, & P. Miranda-Ribeiro, Oct., 1942 (10

Table VII. Measurement Ratios and Counts for P. auroguttatus, P. strigaticeps, and P. asperatus

	P. auroguttatus		P. strigaticeps			P. asperatus
Locality	Pirapora, São Fr.	Rio Camanducaia	Rio Mogi-Guaçu	Rio Piracicaba	Rio Piracicaba	Pirapora, São Fr.
Cat. No.		D. Z. 3191		M.N. 1017, 1019 in pt.; D. Z. 2116 in pt.	M.N. 4258	
No. of specimens	6	6	7	3	9	11
S. L. (mm)	115–203 (139)	139–186 (152)	132–233 (183)	180–197 (187)	143–236 (177)	119–223 (172)
D. in S. L.	5.17–6.57 (5.66)	5.8–6.9 (6.1)	4.58–5.72 (5.08)	5.04–5.8 (5.44)	4.90–5.51 (5.14)	5.33–6.86 (5.80)
H. in S. L.	3.01–3.22 (3.08)	3.06–3.35 (3.16)	2.98–3.29 (3.15)	3.12–3.25 (3.18)	3.00–3.41 (3.20)	2.84–3.27 (3.03)
W. of H. in H.	1.00–1.11 (1.06)	1.09–1.16 (1.12)	1.00–1.12 (1.05)	1.04–1.08 (1.06)	.99–1.08 ⑨ (1.04) ⑨	1.02–1.16 (1.09)
D. of H. in H.	1.81–2.01 (1.90)	1.9–2.1 (2.0)	1.53–1.85 (1.73)	1.69–1.82 (1.77)	1.60–1.85 (1.72)	1.78–2.36 (1.99)
Interorb. in H.	2.7–3.09 (2.94)	2.65–3.18 (2.93)	2.57–2.92 (2.74)	2.61–2.64 (2.62)	2.33–2.79 (2.57)	2.65–3.58 (3.00)
Sn. in H.	1.6–1.65 (1.62)	1.55–1.70 (1.62)	1.54–1.68 (1.61)	1.56–1.6 (1.58)	1.52–1.66 (1.58)	1.46–1.54 (1.50)
Eye in H.	5.2–5.7 (5.5)	6.1–6.8 (6.3)	5.3–6.8 (6.0)	5.8–6.5 (6.2)	5.7–6.8 (6.3)	6.7–8.3 (7.4)
Eye in Interorb.	1.73–2.05 (1.86)	1.91–2.38 (2.16)	1.92–2.53 (2.20)	2.2–2.5 (2.4)	2.10–2.90 (2.45)	2.05–3.04 (2.49)
Mand. ram. in Interorb.	1.33–1.50 (1.41)	1.41–1.81 (1.59)	1.51–1.84 (1.66)	1.6–1.8 (1.7)	1.69–1.89 (1.78)	1.38–1.81 (1.62)
Sn.-dor. in S. L.	2.34–2.54 (2.43)	2.36–2.59 (2.41)	2.31–2.57 (2.44)	2.32–2.49 (2.40)	2.33–2.54 (2.44)	2.30–2.57 (2.42)
Dor. base in Sn.-dor.	1.49–1.87 (1.64)	1.76–1.96 (1.82)	1.63–1.76 (1.70)	1.72–1.80 (1.75)	1.64–1.82 (1.73)	1.57–1.85 (1.60)
Dor.-ad. in Sn.-dor.	2.14–2.68 (2.45)	1.84–2.20 (2.03)	2.11–2.56 (2.36)	2.21–2.36 (2.28)	2.16–2.75 (2.36)	2.37–3.00 (2.59)
Ad. spine in Dor.-ad.	1.44–2.06 (1.66)	2.17–2.66 (2.35)	1.46–2.05 (1.74)	1.62–1.75 (1.69)	1.56–1.94 ⑨ (1.70) ⑨	1.54–2.32 (1.89)
Dor. spine in Sn.-dor.	1.15–1.30 (1.24)	1.24–1.45 (1.36)	1.19–1.40 ⑥ (1.29) ⑥	1.24–1.3 (1.27)	1.28–1.49 (1.37)	1.36–1.74 (1.53)
Pect. spine in Sn.-dor.	1.07–1.30 (1.22)	1.22–1.44 (1.34)	1.19–1.58 (1.33)	1.25–1.39 (1.31)	1.20–1.49 (1.34)	1.21–1.50 (1.36)
D. of Caud. P. in L. of Caud. P.	2.91–3.34 (3.11)	2.81–3.26 (3.04)	2.61–2.89 (2.76)	2.55–2.75 (2.68)	2.53–2.76 (2.66)	2.70–3.30 (3.04)
Teeth	47–66 ③ (59) ③ / 48–68 (59)	60–77 (67) / 54–84 (64)	52–66 (58) / 56–83 ⑥ (64) ⑥	47–53 (51) / 46–57 (50)	54–66 ⑨ (61) ⑧ / 50–68 (61)	41–54 ⑩ (48) ⑩ / 44–57 ⑩ (50) ⑩
Scutes	26 ③–27 ①	26 ⑤–27 ①	26 ④–27 ①	26	26 ⑦–27 ②	26

in M. N. 4259 and 10 sent to Stanford University, California, U. S. A.).

This species has the following features notable: long snout, small eye, broad mandibular ramus, long dorsal base with short dorsal spine, and long pectoral spines. In no one of these is it exceptional.

The measurement ratios and counts for this species are given in Table VII.

The head of *P. asperatus* is flat and broad. The caudal peduncle is definitely flattened below. Supraorbital and supraoccipital ridges low, rounded, indistinct. A single scute bordering supraoccipital in all 20 specimens examined. Barbel rather well-developed, its free portion equal to about 3/4 of an eye diameter. Scutes not carinate. Belly almost completely plated in the largest available specimens. Pectoral spines with well-developed hooks only in largest specimens, reaching about 2/5 of the way along ventrals, which in turn reach about to end of anal base. Lowest caudal ray about equal to head length, shortest caudal ray about 3/4 the length of uppermost ray.

The specimens are at present faded brown with few color markings remaining. Some of the specimens seem to have had reticulations at least on the head, fore part of body, and pectorals; others show no trace of any marks whatever.

There are only a few other species of *Plecostomus* in which the mandibular ramus is ever as broad as in *P. asperatus* and of these only *P. albopunctatus* has an equally small eye, but *P. albopunctatus* has the ventrals equal to or greater than the pectorals.

The specimens at hand agree excellently with Castelnau's plate, and with what can be inferred from Regan's redescription of Castelnau's type. Castelnau's specimen, however, is said to have come from the Araguaia.

9. *Plecostomus macrops* Eigenmann & Eigenmann (Plate 6, fig. 12)

Plecostomus macrops Eig. & Eig., 1888, Proc. Calif. Acad. Sci., 2nd ser., vol. 1, p. 170 (Rio das Velhas, tributary to Rio São Francisco); Eig. & Eig., 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 398 (Rio das Velhas); Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 214 (on the type).

Three forms, which may eventually be shown to represent three species, are here provisionally identified as *P. macrops*. The following examined material certainly is *P. macrops*, and is in part topotypic for that species: Rio das Velhas, tributary to Rio São Francisco — one specimen, 132 mm S. L., coll. G. S. Myers, A. Carvalho, & P. Miranda Ribeiro, 1942 (M. N. 4260); Rio São Francisco, at Pirapora, Minas Gerais — 4 specimens, 40-112 mm. S. L., coll. G. S. Myers, P. Miranda-Ribeiro, & A. Carvalho, Oct., 1942 (2 in M. N. 4261 and 2 sent to Stanford University, California, U. S. A.). Two rather different forms from the Rio Mogi-Guaçu represented by seven specimens collected by O. Schubart in June-July of 1944 are temporarily identified as this species (M. N. 4262).

Measurement ratios and counts for the three forms are given in Table VIII.

There are only two specimens from the Rio das Velhas and Rio São Francisco over 70 mm in S. L. These are best characterized, as compared with other species of this group, by the large eye, the raised supraorbital ridges, and the rather deeply concave caudal.

The head, in the two specimens mentioned above, is not notably broad and flat. Caudal peduncle very slightly flattened below. The supraoccipital, as well as the supraorbitals, has a definite, though rounded, ridge. The single plate bordering the supraoccipital posteriorly shows signs of division in both specimens. Free portion of barbel equal to nearly half an eye diameter. Scutes not carinate. Belly entirely naked in smaller, commencing to form plates in the center in the larger specimen. Pectoral spines without developed hooklets, reaching about 2/5 of the way along ventrals, which in turn reach about to the end of anal base.

Color of larger fish entirely faded. Smaller specimen with some dark markings on fins, best developed on dorsal. The fins were apparently darkly pigmented except for pinkish spots and reticulations, these markings forming more or less continuous wavy lines across the fin rays and interradial membranes (the pattern very similar to that shown for *P. cordovae* in Regan's plate, 1904, pl. 9).

Caudal with light spots and blotches on a dark ground.

The two specimens at hand agree remarkably well with Regan's redescription of the type of *P. macrops*, except that the head of the holotype is said to be as broad as long.

In contrast with the above specimens, the seven provisionally identified as *P. macrops* from the Mogi-Guaçu do not agree well with anything. Within themselves the Mogi-Guaçu specimens do not form a compact group; to get any degree of compactness it is necessary to split the specimens into two groups, and even then one of the specimens falls more or less between the two. All seven, however, have a general superficial similarity. They all agree with *P. macrops* in possessing a large eye, supraorbital ridges, and a deeply incised caudal, and in coloration. Since all seven are small specimens, there would seem to be little object in discussing them further at this point. The identification of these specimens with *P. macrops* is provisional.

10. *Plecostomus goyazensis* Regan

Plecostomus goyazensis Regan, 1907, Proc. Zool. Soc. London for 1907, p. 798, text fig. 207 (Goiaz).

The author has never seen specimens of *Plecostomus* from Goiaz and has no idea what relationship exists between the fishes of that state and those of Southeastern Brazil. Nor has the author any idea concerning the relationship between *P. goyazensis* Regan and *P. lima atropinnis* described by Eigenmann and Eigenmann (1890, *Occ. Pap. Calif. Acad. Sci.*, vol. 1, p. 410) from Goiaz.

11. *Plecostomus variipictus* R. von Ihering

Plecostomus variipictus R. von Ihering, 1911, Rev. Mus. Paulista, vol. 8, p. 390 (Rio Pardo, near Barretos, State of São Paulo).

? Plecostomus margaritifer butantanis R. von Ihering, 1911, Rev. Mus. Paulista, vol. 8, p. 394 (Butantan, Rio Pinheiros, near São Paulo, State of São Paulo).

Material examined: Rio Pardo, near Barretos, São Paulo — D. Z. 2114, holotype,

Table VIII. Measurement Ratios and Counts for P. macrops

	P. MACROPS		P. MACROPS (?)			
			Pirassununga, Rio Mogi-Guaçu			
	Rio das Velhas	Pira-pora	Form a		Form b	Form c
No. of specimens	1	1		2	1	4
T. L. (mm)	132	112	—	—	116	132–160
S. L. (mm)	96	84	103	95	85	100–119
D. in S. L.	4.85	4.42	4.70	4.96	5.31	4.68–5.02
H. in S. L.	3.00	2.93	2.92	2.97	3.12	3.16–3.33
H. to gill opening in S. L.	3.93	3.78	—	—	4.12	3.94–4.14
W. of H. in H.	1.24	1.18	1.14	1.14	1.24	1.10–1.18
D. of H. in H.	1.72	1.65	1.73	1.77	1.89	1.59–1.72
Interorb. in H.	3.26	2.95	3.12	2.98	2.96	2.58–2.73
Sn. in H.	1.66	1.75	1.60	1.66	1.81	1.63–1.66
Eye in H.	5.3	4.9	5.7	5.3	4.5	5. 2–5.3
Mand. ram. in Interorb.	1.96	2.15	1.90	2.28	2.55	2.78–2.97
Sn.–dor. in S. L.	2.34	2.52	2.29	2.26	2.35	2.34–2.49
Dor. base in Sn.-dor.	1.90	1.70	1.70	1.66	1.90	1.60–1.88
Dor.-ad. in Sn.-dor.	2.42	2.58	2.80	2.61	2.17	2.34–2.75
Ad. spine in Dor-ad.	1.67	1.71	1.61	1.81	2.03	1.53–1.83 ③
Dor. spine in Sn.-dor.	1.28	1.34	1.48	broken	1.50	1.36–1.53
Pect. spine in Sn.-dor.	1.43	1.45	1.36	1.33	1.44	1.29–1.51
Vent. spine in Sn.-dor.	1.59	1.56	—	—	1.70	1.57–1.75
D. of Caud. P. in L. of Caud. P.	3.42	3.36	2.72	2.50	3.30	3.19–3.48
Scutes	26&27	27&27	26	26	26	26
Sc. bet. Anal & Caud.	14	13	13	13	—	—
Sc. bet. Dor & Ad.	8	7	6	7	—	—
Sc. bordering supraoc.	1	1	1	1	1	1
Teeth	38	Ca. 32	34	ca. 25	?	30–35 ③
	46	30	43	30	ca. 30	31–38

305 mm S. L., coll. F. Lex; Rio Tieté — D. Z. 2141, 3 specimens, 116-139 mm S. L., 1906; D. Z. 3241, 2 specimens, 131 & 225 mm S. L.

This species appears to attain a comparatively large size and to be rather boldly marked with light spots and reticulations in life.

The measurement ratios and counts for *P. variipictus* are given in Table IX.

The following description is compiled from notes made on the specimens when they were examined in São Paulo. The holotype lacks supraorbital ridges. The scutes are spiny, the spinelets arranged in rows. Abdomen with a wide naked area at ventral bases and before anus; fore part of belly completely plated. Head with light spots which form reticulations in the temporal region. Body with similar, but faded, reticulations, most prominent at dorsal base. Dorsal with a light vertical line on each interradial membrane, those foreward nearly straight, the posterior ones wavy. Ventrals, pectorals, and caudal with light spots and wavy lines.

The Tieté specimens differ from the type in being somewhat more depressed. Also, the supraorbitals are slightly raised and the dorsal is spotted rather than lined. These are, however, not very important discrepancies.

Table IX. Measurement Ratios and Counts for P. variipictus

	RIO PARDO	RIO TIETÉ
Cat. No.	D. Z. 2114	D. Z. 2141 & 5241 in pt.
No. of specimens	1	5
S. L. (mm)	305	116–225 (160)
D. in S. L.	4.7	5.0–5.9 (5.5)
H. in S. L.	3.28	2.96–3.32 (3.17)
W. of H. in H.	1.05	1.08–1.15 (1.11)
D. of H. in H.	1.5	1.7–1.9 (1.8)
Interorb. in H.	2.74	2.62–2.81 (2.72)
Sn. in H.	1.51	1.56–1.60 (1.58)
Eye in H.	7.5	5.7–7.8 (6.4)
Eye in Interorb.	2.73	2.03–2.93 (2.36)
Mand. ram. in Interorb.	?	2.09–2.46 (2.20)
Sn.-dor. in S. L.	2.35	2.27–2.50 (2.38)
Dor. base in Sn.-dor.	1.71	1.68–1.98 (1.85)
Dor.-ad. in Sn.-dor.	2.38	2.08–2.52 (2.23)
Ad. spine in Dor.-ad.	2.25	1.87–2.15 (1.99)
Dor. spine in Sn.-dor.	1.40	1.31–1.69 (1.41)
Pect. spine in Sn.-dor.	?	1.34–1.49 (1.41)
D. of Caud. P. in L. of Caud. P.	3.26	3.06–3.39 (3.21)
Teeth	25 — 27	31–49④ (39)④ — 27–50④ (38)④
Scutes	26&26	25–27 (26)

Plecostomus margaritifer butantanis might be a synonym of *P. variipictus* or *P. strigaticeps*, or it might be a good species. In nearly a page devoted to describing this subspecies, von Ihering has said only 1) that it resembles *P. margaritifer;* 2) that it has the dorsal spine equal to the head; and 3) that it has spots, which tend to fuse on the head. The first statement is valueless; the length of the dorsal spine seems to be of systematic importance even though von Ihering states that it is not; and the extensive description of the spotting on the fish does not mention whether the spots were dark or light. They were probably light. The present author was unable to find the type and only specimen of this subspecies in the Departamento de Zoologia and topotypes were not available. The only possible courses open seemed to be to consider the subspecies unrecognizable or to synonymize it with something or other. The latter course has been followed.

12. *Plecostomus garmani* Regan

Plecostomus garmani Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 214, pl. 10, fig. 1 (Rio das Velhas, tributary to Rio São Francisco, State of Minas Gerais).

Not seen. This fish seems to have at least a superficial resemblance to what has been here identified as *P. auroguttatus*. However, *P. garmani* as described by Regan differs from that species in the significantly narrower mandibular ramus and in the deeper caudal peduncle.

Regan's measurement ratios and counts for this species are given in Table X.

13. *Plecostomus iheringii* Regan

Plecostomus iheringii Regan, 1907, Proc. Zool. Soc. London for 1907, p. 795, pl. 47, fig. 1 (Rio Piracicaba).

No specimens seen.

During the course of the present work *P. iheringii* has been tentatively synonymized with several other species. First it was considered to be the same as *P. strigaticeps*, but the mandibular ramus of *P. iheringii* seemed to be too narrow. Later it was considered as a possible synonym of *P. hermanni*, but the supraorbitals are said to be raised in *P. iheringii* and its interorbital is somewhat too broad for *P. hermanni*. *P. variipictus* has too long a caudal peduncle. One of the forms

from the Mogi-Guaçu that have been provisionally identified as *P. macrops* might be *P. iheringii* but none of the forms agree well; either the interorbital is too narrow, the caudal peduncle is too long, the mandibular ramus too narrow, or some combination of these three discrepancies occurs. The general result is that *P. iheringii* is here considered a good species without representation in the collections examined.

The salient features which would seem, in conjunction, to distinguish *P. iheringii* from its nearest relatives are: interorbital unusually broad, 2 1/2 in head, with the supraorbital ridges raised; eye rather small, 6 1/4 in head; and the pectoral spines with definite hooklets developed in a specimen 150 mm in T. L.

Regan's measurement ratios and counts for this species are given in Table X.

14. *Plecostomus hermanni* R. von Ihering (Plate 8, fig. 15)

Plecostomus hermanni R. von Ihering, 1905, Ann. Mag. Nat. Hist., ser. 7, vol. 15, p. 560 (Rio Piracicaba).

Material examined: Rio Piracicaba — D. Z. 2134, one, 180 mm S. L.; D. Z. 2115, 2 specimens, 153 & 183 mm S. L., coll. R. von Ihering; D. Z. 2116 (partim), one, 196 mm S. L., coll. R. von Ihering; M. N. 1019 (partim), 3 specimens, 131-151 mm S. L.; Rio Piracicaba, below Piracicaba — 4 specimens, 138-155 mm S. L., coll. O. Schubart, May 22, 1945 (M. N. 4264); Rio Mogi-Guaçu, below Pirassununga — 9 specimens, 139-180 mm S. L., coll. O. Schubart, June-July, 1944 (M. N. 4263).

This species seems to be relatively lacking in variability. Perhaps the greatest variation in the specimens at hand is in color. Unfortunately, the species possesses no salient features by which it may be immediately distinguished. In the collections sent in by Dr. Schubart it was much less common, incidentally, than either *P. regani* or *P. striga-ticeps*.

Measurement ratios and counts for this species are given in Table X.

Head not particularly depressed. Caudal peduncle somewhat flattened below. Interorbital region slightly and evenly convex, almost flat. Supraorbitals and supraoccipital not ridged. Supraoccipital bordered posteriorly by a single scute. Barbel variable, usually short and broad, less than 1/2 an eye diameter. Belly completely plated only in the larg-

Table X. Measurement Ratios and Counts for P. garmani, P. iheringii, and P. hermanni

	P. GARMANI	P. IHERINGII	PLECOSTOMUS HERMANNI		
	ORIGINAL DESCRIPTION	ORIGINAL DESCRIPTION	ORIGINAL DESCRIPTION		
Locality	Piracicaba	Piracicaba	Piracicaba	Piracicaba	Mogi-Guaçu
No. of specimens	1	1	1	4	9
S. L. (mm)	(260 T. L.)	(150 T. L.)	(240 T. L.)	138–155 (145)	139–180 (162)
D. in S. L.	6	4 2/3	5	4.3–5.0 (4. 6)	4.28–4.88 (4.59)
H. in S. L.	3 1/2	3 1/3	3 1/5	2.93–3.00 (2.97)	2.89–3.13 (3.01)
W. of H. in H.	1 1/7	1 1/10	nearly 1	1.10–1.17 (1.14)	1.07–1.17 (1.11)
D. of H. in H.	1 3/4	1 3/5	1 2/3	1.58–1.76 (1.69)	1.54–1.86 (1.67)
Interorb. in H.	3 1/6	2 1/2	2 2/3	2.68–3.04 (2.83)	2.74–3.24 (2.98)
Sn. in H.				1.52–1.62 (1.56)	1.53–1.64 (1.58)
Eye in H.	6 1/2	6 1/4	ca. 6	6.0–6.7 (6.5)	5.2–6.6 (6.1)
Mand. ram. in Interorb.	1 4/5	2	1 5/6	2.26–2.68 (2.44)	1.92–2.58 (2.15)
Sn.-dor. in S. L.				2.30–2.41 (2.34)	2.24–2.35 (2.29)
Dor. base in Sn.-dor.				1.64–1.78 (1.72)	1.61–1.75 (1.69)
Dor.-ad. in Sn.-dor.				2.47–3.18 (2.78)	2.36–2.92 (2.61)
Ad. spine in Dor.-ad.				1.50–1.76 (1.47)	1.46–1.86 (1.66)
Dor. spine in Sn.-dor.	(= H.)	(little less than H.)	(nearly = H.)	1.43–1.49 (1.46)	1.36–1.53⑧(1.46)⑨
Pect. spine in Sn.-dor.				1.30–1.49 (1.37)	1.29–1.60 (1.40)
D. of Caud. P. in L. of Caud. P.	2 3/4	2 3/4	2 3/5	2.48–2.81 (2.66)	2.48–2.88 (2.64)
Teeth		40 / 40		29–32 (30) / 28–36 (32)	28–40 (31) / 27–35 (31)
Scutes	26	26	26	25①–26⑧	25①–26⑧

est available specimens. Scutes not carinate, but rather spiny, the spinules arranged on all except the anterior scutes in parallel or radiating rows. Pectoral spines with developing hooklets in a specimen 145 mm in S. L., well-developed on the outer 3/4 of the spines in largest specimens. Pectorals reaching 1/3 to 1/2 of the way along ventrals, which reach beyond origin of anal. Caudal short, less oblique than in other species, comparatively little incised, its central rays about 2/3 as long as the lowermost ray, which in turn is somewhat shorter than head.

In color the Piracicaba specimens collected by Schubart are dark gray, with blackish spots on the head; larger and more poorly defined spots on the body and pectorals and caudal; and the dorsal plain dusky. Some of the Mogi-Guaçu specimens are uniform grayish. Others have light reticulations on the head, pectorals, and ventrals, those on the pectorals forming very regular hexagonals.

Because this species is so nondescript, it is impossible to identify the specimens at hand with certainty as *P. hermanni*. However, they agree well with the description of that species, except perhaps for the interorbital, which von Ihering states as being 2 2/3 in the head of *P. hermanni*.

15. *Plecostomus unae* Steindachner

Plecostomus robinii Steindachner (non Cuv. & Val.), 1876, Sitz. Kais. Akad. Wiss. Wien, vol. 74, p. 676 (Rio Una, State of Bahia); Eig. & Eig., 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 412 (Rio Una, Bahia).

Plecostomus unae Steindachner, 1878, Sitz. Kais. Akad. Wiss. Wien, vol. 77, p. 383 (substitution of name).

Not seen. This species, from the descriptions, seems to be near *P. hermanni*, but to differ in having well-marked dark spots on the head, body, and fins. However, such well-defined dark spots do not seem to exist elsewhere in the *P. hermanni* section of *Plecostomus*, and it may be that *P. unae* has very different relationships than those suggested here.

16. *Plecostomus margaritifer* Regan (Plate 7, figs. 13 and 14)

Plecostomus margaritifer Regan, 1907, Proc. Zool. Soc. London for 1907, p. 796, pl. 47, fig. 2 (Rio Piracicaba, State of São Paulo).

No specimens have been examined which agree satisfactorily with the description of this species given by Regan. However, two

Table XI. Measurement Ratios and Counts for P. margaritifer and P. francisci

	PRECOSTOMUS MARGARITIFER			P. FRANCISCI
	ORIGINAL DESCRIPTION	Form a	Form b	
Locaclity	Piracicaba	Mogi-Guaçu	Mogi-Guaçu	Pirapora
No. of specimens	1	5	4	1
S. L. (mm)	(160 T.L.)	164–310 (261)	200–228 (220)	360
D. in S. L.	4 2/3	4.17–4.83 (4.42)	4.24–4.57③ (4.42)③	5.14
H. in S. L.	3 1/3	2.93–3.32 (3.18)	3.06–3.18 (3.12)	3.43
W. of H. en H.	1 1/8	1.04–1.17 (1.09)	1.00–1.09 (1.04)	1.09
D. of H. in H.	1 3/4	1.46–1.62 (1.56)	1.47–1.55 (1.52)	1.58
Interob. in H.	2 3/4	2.61–2.94 (2.72)	2.65–2.82 (2.74)	3.05
Sn. in H.		1.44–1.59 (1.49)	1.45–1.51 (1.47)	1.55
Eye in H.	6	6.6 8.0 (7.5)	6.4 –6.7 (6.6)	7.1
Eye in Ieterorb.		2.24–2.99 (2.77)	2.33–2.51 (2.39)	2.32
Mand. ram. in Interorb.	1 4/5	2.24–2.50 (2.31)	2.25–2.73 (2.48)	2.03
Sn.dor. in S.L.		2.19–2–43 (2.35)	2.32–2.43 (2.36)	2.55
Dor base in Sn.-dor.		1.55–1.81 (1.65)	1.58–1.69 (1.64	1.57
Dor.-ad. in Sn.-dor.		2.09–2.23 (2.17)	2.34–2.48 (2.41)	2.08
Ad. spine in Dor-ad.		1.92–2.40 (2.23)	1.75–1.96 (1.86)	2.01
Dor. spine in Sn.-dor.		1.14–1.22 (1.19)	1.18–1.27 (1.22)	1.10
Pect. spine in Sn.-dor.		1.20–1.47 (1.30)	1.23–1.32 (1.28)	1.17
D of Caud. P. in L. of Caud. P.	2 3/5	2.57–2.92 (2.75)	2.72–2.97 (2.84)	3.31
Teeth	18–20 / 15–17	18–26 (22) / 19–31 (24)	21–29 (25) / 24–30 (25)	27 / 30
Scutes	27	26④–27①	26	26

rather distinct forms (called here *a* and *b*) that are certainly near to *P. margaritifer* have been sent in by Dr. Schubart from the Rio Mogi-Guaçu. Both of these forms are here provisionally identified as *P. margaritifer*. One form is represented by five specimens 164-310 mm in S. L. and the other by four specimens 200-228 mm in S. L. (form *a*, M. N. 4265 and form *b*, M. N. 4266).

Measurement ratios and counts for the two forms and for *P. margaritifer* as described by Regan are given in Table XI.

The species as recognized here (including the three forms) may at once be differentiated from all other species of *Plecostomus* by the combination of the light markings, few large teeth, long dorsal, number of scutes, and deep caudal peduncle. Its only close relative seems to be *P. francisci* (and possibly *P. alatus*).

The head is little depressed in *P. margaritifer* and in form *a*, moderately depressed in *b*. The caudal peduncle is slightly flattened below in forms *a* and *b* (*P. margaritifer* unknown). Single scute bordering supraoccipital showing no tendency to divide. Supraorbitals slightly raised in *P. margaritifer* and form *a*, very strongly raised in form *b*. The barbel is equal to less than half an eye diameter in form *b*, more than half in the other two. Scutes of upper two lateral series in forms *a* and *b* rather distinctly angulated, but not carinate; all scutes spinulose. Hooklets on pectoral spines short. The type of the species, a specimen 160 mm in T. L., has the "lower surface of head and abdomen naked, except for some small scattered granules." In the specimen of form *a* 164 mm in S. L., the plates have commenced to develop, chiefly in the center of the abdomen, while in the largest specimens of both forms *a* and *b* the ventral plating is nearly complete. The abdominal plating of form *b* seems to come in at a smaller size than in *a* however.

Pectorals reaching 1/3 to 1/2 of the way along ventrals; ventrals about to end of anal base. Dorsal spine longer than head, extending about 2/3 to 3/4 o fthe way along the last dorsal ray. Caudal not particularly concave, the shortest ray about 2/3 the length of the longest, which is about equal to the head length.

In color *P. margaritifer* and form *a* are dark fishes with scattered light spots which show no tendency to fuse. On the rear of the body there is one spot per scute. The dorsal in the type is said to be dusky; in form *a* the interradial membranes have light spots similar to those on the body, as do the other fins. Form *b* differs radically in color from the above. The dark background of form *b* is obscured by bright orange lines and reticulations on the head, body, and fins. These become straight light lines running longitudinally along each scute row of the caudal peduncle.

Plecostomus margaritifer as described by Regan differs from the forms at hand in the broader mandibular ramus and the fewer teeth (a very peculiar combination of differences).

Form *a* differs from form *b* in the smaller eye, in the lack of pronounced supraorbital ridges, and in the somewhat narrower body, as well as in color.

17. *Plecostomus francisci* Lütken

Plecostomus francisci Lütken, 1873, Overs. Dan. Selsk., no. 3, p. 30 (Rio São Francisco) [not seen] and 1875, Vidensk. Selsk., vol. 12, p. 143 (Rio das Velhas); Eig. & Eig., 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 410.

One specimen examined, 360 mm in S. L., from Pirapora, Rio São Francisco, Minas Gerais, coll. by G. S. Myers, P. Miranda-Ribeiro, and A. Carvalho, Oct., 1942 (M. N. 4279).

Measurement ratios and counts for this specimen are given in Table XI.

Superficially this specimen bears a certain amount of resemblance to form *a* of *P. margaritifer*. However, aside from measurement differences, the caudal peduncle is more strongly flattened below, the supraorbitals form low raised ridges, the abdomen is incompletely plated, and the light spots are more numerous.

The identification of this specimen with *P. francisci* is not without its dubious points. The chief difficulty lies in the confusion between this species and *P. alatus* of Castelnau. Regan considered the two to be the same, but Lütken (1875, loc. cit.) believed that two species were represented; unfortunately he

separated the two chiefly on the presence or absence of a naked area at the tip of snout, which is a growth character in at least some species. The present author is inclined to believe that two species actually are represented.

18. *Plecostomus alatus* (Castelnau)

Hypostomus alatus Castelnau, 1855, Anim. Amér. Sud, p. 41, pl. 20, fig. 1 (Rio Sabará, in the Rio São Francisco watershed, State of Minas Gerais).

Plecostomus alatus Günther, 1864, Cat. Fish. British Mus., vol. 5, p. 264 (Rio Cipo, Rio São Francisco watershed); Lütken, 1875, Vidensk. Selsk., vol. 12, p. 144 (Rio das Velhas, Rio São Francisco watershed); Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 211 (on the type and on the Rio Cipo specimen).

No specimens seen.

Plecostomus alatus has been the source of considerable confusion. Almost every species with light spots and a long dorsal has been confused with it. For one thing, the species was described in a very indefinite way by Castelnau. For another, the Eigenmanns seem to have misread Castelnau's type locality as Rio Araguaia.

The author has been forced to hypothesize *P. alatus* as a fish that looks much like *P. regani*, with numerous fine teeth. If it turns out to be a fish like *P. margaritifer* with comparatively few large teeth, the author has *P. alatus* among species which are not its nearest relatives.

19. *Plecostomus regani* R. von Ihering (Plate 8, fig. 16)

Plecostomus regani R. von Ihering, 1905, Ann. Mag. Nat. Hist., ser. 7, vol. 15, p. 558 (Rio Piracicaba, State of São Paulo).

Specimens examined: Rio Piracicaba, below Piracicaba — 18 specimens, 96-230 mm S. L., 131-300 mm T. L., coll. O. Schubart, May 22, 1945 (M. N. 4267); Rio Mogi-Guaçu, near Pirassununga — 5 specimens, 58-82 mm S. L. (M. N. 4269); 6 specimens, 134-253 mm S. L., coll. G. S. Myers, H. Rosa, & A. Carvalho, March 25, 1944 (3 in M. N. 4270 and 3 sent to Stanford University, California, U. S. A.); 17 specimens, 90-259 mm S. L., coll. O. Schubart, June-July, 1944 (M. N. 4268).

This is one of the most distinct species in the genus. There are, in fact, not more than four other species with which it could be confused. Its closest relatives seem to be *P. alatus* to the north and *P. luteomaculatus* to the south. The characters which distinguish *P. regani* from these two species cannot be stated with any certainty as the author has seen neither *P. luteomaculatus* nor *P. alatus*.

Measurement ratios and counts for *P. regani* are given in Table XII.

Table XII. Measurement Ratios and Counts for P. regani

LOCALITY	RIO PIRACICABA	RIO MOGI-GUAÇU
No. of specimens	5	17
S. L. (mm)	162–230 (192)	90–259 (185)
D. in S. L.	4.72–5.11 (4.90)	4.21–5.52 (4.70)
H. in S. L.	3.19–3.42 (3.31)	3.00–3.56 (3.30)
W. of H. in H.	1.05–1.14 (1.10)	1.04–1.25 (1.13)
D. of H. in H.	1.59–1.64 (1.61)	1.47–1.89 (1.60)
Interorb. in H.	2.40–2.56 (2.51)	2.44–2.91 (2.65)
Sn. in H.	1.50–1.56 (1.54)	1.41–1.72 (1.55)
Eye in H.	5.8–6.5 (6.2)	4.8–6.6 (5.7)
Mand. ram. in Interorb.	2.44–2.69 (2.57)	1.88–2.30 (2.13)
Sn.-dor. in S. L.	2.41–2.53 (2.48)	2.29–2.61 (2.44)
Dor. base in Sn.-dor.	1.56–1.83 (1.65)	1.44–1.83 (1.62)
Dor.-ad. in Sn.-dor.	1.92–2.17 (2.03)	1.86–2.50 (2.19)
Ad. spine in Dor.-ad.	1.78–2.11 (1.97)	1.87–2.59 (2.19)
Dor. spine in Sn.-dor.	1.00–1.16 (1.05)	.94–1.33⑯ (1.07)⑯
Pect. spine in Sn.-dor.	1.26–1.44 (1.35)	1.26–1.56 (1.37)
D. of Caud. P. in L. of Caud. P.	2.94–3.13 (3.03)	3.16–3.68 (3.42)
Teeth	35–52 (41) 37–50 (42)	43–76 (58) 48–67 (57)
Scutes	28④–29①	28⑭–29⑤

Head comparatively high and narrow for this section of the genus. Caudal peduncle somewhat flattened above and below. Supraorbitals and supraoccipital slightly raised. Supraoccipital bordered by a single scute in all except one of the 46 specimens examined. Barbel well developed, its free part equal to about 1/2 an eye diameter. Scutes not carinate, not very spinulose. Belly almost completely plated even in specimens less than 100 mm in S. L. Pectoral spines without well-developed hooklets, reaching about 2/5 of the way along ventrals, which reach somewhat beyond posterior end of anal base. Central caudal ray about 2/3 the length of the lowest, which is about equal to the head.

Ground color blackish with small, scattered whitish-yellow spots on head, body, and fins. These spots are smaller and lighter than those of *P. strigaticeps* and show no tendency to fuse.

20. *Plecostomus luteomaculatus* Devincenzi & Teague

Plecostomus luteomaculatus Devincenzi & Teague, 1942, An. Mus. Hist. Nat. Montevideo, ser. 2, vol. 5, no. 4, p. 20 (Rio Uruguay).

Not seen. The species bears a strong superficial resemblance to *P. regani*.

21. *Plecostomus plecostomus* (Linnaeus)

Acipenser plecostomus Linnaeus, 1757, Systema Naturae, 10th ed., p. 238 (America).

Plecostomus guacari Regan, 1904, Trans. Zool. Soc. London, vol. 17, pt. 3, p. 205 (Rio Amazonas; Guiana; Venezuela; and Trinidad).

? *Plecostomus ancistroides* R. von Ihering, 1911, Rev. Mus. Paulista, vol. 8, p. 396 (Rio Tatuí, tributary to Rio Sorocaba; and Rio Piracicaba, State of São Paulo).

? *Plecostomus brevis* Nichols, 1919, Rev. Mus. Paulista, vol. 11, p. 413 (State of São Paulo).

No specimens from Southeastern Brazil examined. The species is found in the Nordeste of Brazil and in the Amazon region, and it, or a geographic variant of it, occurs again in the Rio La Plata basin and has been recorded at least twice from São Paulo. *P. ancistroides* and *P. brevis* both agree with *P. plecostomus* in having 25 scutes, which are carinate, and in the narrow mandibular ramus. However, the author was unable to find the types of *P. ancistroides* in the Departamento de Zoologia, while *P. brevis* was described from a specimen 67 mm in S. L. Consequently the identification of both of these names is insecure.

22. *Plecostomus commersonii* and related forms

There are at least ten described forms — *P. commersonii* (Cuv. & Val.), *commersonii scabriceps* Eig. & Eig., *spiniger* Hensel, *limosus* Eig. & Eig., *aspilogaster* Cope, *punctatus* (Cuv. & Val.), *subcarinatus* (Castelnau), *affinis* Steindachner, *robinii* (Cuv. & Val.), *interruptus* A. de Miranda Ribeiro — belonging to the *commersonii* group of *Plecostomus*. It may eventually prove that only one species is represented. Of the ten, the author has only been able to differentiate four on the basis of the material at hand, and these four look more like geographical variants than like well-delimited species. Because of the similarity in these four, they have not each been described in full, and no attempt has been made to work out a synonymy for the other described forms of the group. Any decision as to the validity of the ten names made at the present time would certainly be largely invalidated when adequate collections have been made.

The four forms at hand may be separated as follows:

1a. All of the scutes distinctly carinate.
22a. *P. commersonii*

1b. All of the scutes not or only weakly carinate.

2a. Mandibular ramus contained 2.8 or more times in the interorbital; about 35 spots on scute bordering supraoccipital.
22b. *P. punctatus*

2b. Mandibular ramus usually contained fewer than 2.8 times in the interorbital (as much as 3.0 times in small specimens of *P. derbyi*); about 15-20 spots on scute bordering supraoccipital.

3a. Interorbital contained 2.6-3.0 times in the head; abdomen spotted.
22c. *P. derbyi*

3b. Interorbital contained 2.8-3.4 times in head; abdomen plain.
22d. *P. affinis*

22a. *Plecostomus commersonii* (Cuvier & Valenciennes)

Hypostomus commersonii Cuv. & Val., 1840, Hist. Nat. Poissons, vol. 15, p. 495 (La Plata basin; Rio São Francisco); Valenciennes, 1847, Atl. Zool., Poissons, pl. 7, fig. 2 (La Plata basin).

Specimens of *P. commersonii* examined: Rio dos Sinos, Rio Grande do Sul — 4 specimens, Caça e Pesca Nos. 1023-1026 inclusive, 183-410 mm in S. L., coll. A. J. de Faria, 1944.

Measurement ratios and counts for these specimens are given in Table XIV.

These specimens are presumably the Rio La Plata form. They are far rougher than the other three forms available.

22b. *Plecostomus punctatus* (Cuvier & Valenciennes) (Plate 9, fig. 17)

Hypostomus punctatus Cuvier & Valenciennes, 1840, Hist. Nat. Poissons, vol. 15, p. 493 (Rio de Janeiro).

Material examined: Rio Paraíba do Sul — 42 specimens, 51-310 mm S. L., coll. R. Figueira, E. N. de Miranda, & W. Gosline, Nov. 1944 — Feb. 1945 (M. N. 4271a, 4271b, 4271c and 4271d).

These specimens are undoubtedly *P. punctatus*. They are lighter in color and less ridged and asperous than the Rio Grande do Sul *P. commersonii*. However some of the present specimens of *P. punctatus* have all of the scutes carinate.

In a preliminary attempt to find differences between *P. commersonii, P. punctatus, P. derbyi*, and *P. affinis* certain measurements were taken on all specimens of all four of these forms. Measurements ratios from these measurements for all four may be found in Table XIII.

22c. *Plecostomus derbyi* Haseman

Plecostomus derbyi Haseman, 1911, Ann. Carnegie Mus., vol. 7, p. 384, pls. 79-81 (Pôrto União de Vitória, Rio Iguaçu, State of Paraná).

Material examined: Rio Iguaçu, at Pôrto União — 19 specimens, 85-285 mm S. L., coll. G. S. Myers and A. Carvalho, April 21-24, 1944 (10 in M. N. 4272 and 9 sent to Stanford University, California, U. S. A.).

This form seems to be geographically isolated above the falls of the Iguaçu. At least in has not been taken elsewhere. It is very close to *P. affinis*.

22d. *Plecostomus affinis* Steindachner

Plecostomus affinis Steindachner, 1876, Sitz. Kais. Akad. Wiss. Wien, vol. 74, p. 127 (Rio Mucuri, near Santa Clara; Rio Paraíba do Sul; Muriaé; Santo Antônio, near Santo Antônio de Ferros).

Plecostomus commersonii affinis Eig. & Eig., 1890, Occ. Pap. Calif. Acad. Sci., vol. 1, p. 404 (Mendez, Santa Clara, Rio Mucuri; Rio de Janeiro; Rio Doce at Linhares; Rio Paraíba do Sul; Minas Gerais; Rio Santo Antônio).

Material examined: Corrego do Engano, tributary to Rio Itaúna do Norte, State of Espírito Santo — 17 specimens, 69-205 mm S. L., coll. L. Travassos and N. Santos (M. N. 4273).

This form, according to the list of localities given by Steindachner and the Eigenmanns, must be rather common. From the specimens at hand it would seem rather easily differentiable from *P. punctatus*.

23. *Plecostomus rachovii* (Regan)

Plecostomus rachovii Regan, 1913, Ann. Mag. Nat. Hist., ser. 8, vol. 12, p. 555 (Rio de Janeiro).

Not seen. This and the following species seem to be closely related if not identical.

24. *Plecostomus laplatae* Eigenmann

Plecostomus laplatae Eigenmann, 1907, Proc. Washington Acad. Sci., vol. 8, p. 450, pl. 21 (Buenos Aires).

Plecostomus taeniatus Regan, 1908, Ann. Mag. Nat. Hist., ser. 8, vol. 2, p. 358 (Rio La Plata).

Table XIII. Selected Measurement Ratios for P. commersonii, P. punctatus, P. derbyi, and P. affinis

	P. COMMERSONII	P. PUNCTATUS	P. DERBYI	P. AFFINIS
Locality	Rio dos Sinos	Rio Paraíba do Sul	Porto União	Corrego do Engano
No. of specimens	4	29	14	13
S. L. (mm)	183–410 (247)	101–310 (185)	102–285 (146)	152–205 (181)
H. in S. L.	3.27–3.63 (3.38)	2.93–3.89 (3.42)	3.03–3.56 (3.24)	3.30–3.56 (3.44)
Interorb. in H.	2.52–2.83 (2.64)	2.44–2.90 (2.69)	2.58–2.98 (2.77)	2.81–3.40 (3.07)
Eye in H.	8.1–12.8 (9.6)	7.2–10.5 (8.9)	7.1–10.4 (8.2)	8.6–11.0 (9.5)
Mand. ram. in Interorb.	3.21–4.03 (3.50)	2.5–3.8 (3.2)	2.0–3.0 (2.6)	2.0–2.7 (12) (2.4) (12)
D. of Caud. P. in L. of Caud. P.	3.55–4.66 (3.89)	3.27–4.26 (3.83)	3.73–4.30 (3.99)	3.64–4.53 (4.19)

Plecostomus commersonoides Marini, Nichols, & La Monte, 1933, Amer. Mus. Novitates no. 618, p. 3 (Darsena Norte, Buenos Aires).

Not seen. Whether this species and *P. rachovii* belong with the *P. wuchereri* or the *P. commersonii* group is difficult to say.

25. *Plecostomus wuchereri* and related forms

The species surrounding *P. wuchereri* are perhaps the most confusing in the genus. At least eight species have been described in this group, but from the inadequate material at hand it is impossible even to be sure that more than one variable species is represented. In the Nordeste, *Plecostomus vaillanti*, Steindachner described from the Rios Poti and Preto, perhaps belongs here. *P. brevicauda* Günther and *P. wuchereri* Günther were described from Bahia. *P. lima* Lütken was described from Minas Gerais, *P. lütkeni* Steindachner is based on specimens from various localities between Bahia and the Rio Paraíba do Sul. *P. vermicularis* Eig. & Eig. is also based on specimens from the Rio Paraíba do Sul and other localities. *P. tietensis* R. von Ihering and *P. agna* A. de Miranda Ribeiro, based on São Paulo specimens, seem to belong here. Specimens belonging to this group have been examined from here and there in the States of Santa Catarina, São Paulo, Rio de Janeiro, and Minas Gerais, but most of these specimens were old and, though they showed considerable variation, could be separated into no distinct subgroups. However, the material has been entirely inadequate as a basis for any conclusions whatsoever on the group. The best that can be done, therefore, is to give a description of the one form for which adequate new material is available. This form seems to agree most closely with the description given for

25a. *Plecostomus lütkeni* Steindachner (Plate 9, fig. 18)

Plecostomus lima Steindachner (non Lütken), 1876. Sitz. Kais. Akad. Wiss. Wien, vol. 74, p. 121 (Rio Paraíba do Sul; Rio Mucuri: Santo Antônio; Rio Quenda; Rio de Pedra).

Plecostomus lütkeni Steindachner, 1877, Sitz. Kais. Akad. Wiss. Wien, vol. 76, p. 217 (substitution of name for *P. lima*); Eig. & Eig., 1890. Occ. Pap. Calif. Acad. Sci., vol. 1, p. 411 (Rio Santo Antônio; Campos).

Material examined: Rio Paraíba do Sul basin — 8 specimens, 105-145 mm S. L., coll. at Recreio, Minas Gerais, by R. Figueira &

Table XIV. Measurement Ratios and Counts for P. commersonii and P. lütkeni

	P. COMMERSONII	PLECOSTOMUS LUTKENI	
Locality	Rio dos Santos	Rio Paquequer	Ilha das Pombas
N. of specimens	4	5	10
S. L. (mm)	183–410 (247)	114–137 (126)	131–215 (191)
D. in S. L.	4.77–5.33 (5.06)	5.85–6.72 (6.41)	5.42–6.42 (5.81) ⑨
H. in S. L.	3.27–3.63 (3.38)	3.19–3.38 (3.30)	3.17–3.48 (3.36)
H. to upper angle of gill opening in S. L.	4.18–4.41 (4.25)	3.99–4.18 (4.06)	3.98–4.34 (4.16)
W. of H. in H.	1.13–1.20 (1.16)	1.10–1.19 (1.14)	1.09–1.21 (1.16)
D. of H. in H.	1.54–1.65 ③	1.91–2.06 (1.96)	1.64–1.99 (1.82)
Interorb. in H.	2.52–2.83 (2.64)	2.95–3.28 (3.09)	2.75–3.01 (2.85)
Sn. in H.	1.59–1.70 (1.67)	1.58–1.66 (1.63)	1.46–1.63 (1.55)
Eye in H.	8. 1–12.8 (9. 6)	6. 6–7.3 (6.9)	7. 2–8. 8 (7. 9)
Mand. ram. in Interorb.	3.21–4.03 (3.50)	1.55–1.85 (1.71)	1.89–2.24 (2.03)
Sn.–dor. in S. L.	2.51–2.64 (2.55)	2.45–2.61 (2.52)	2.50–2.69 (2.57)
Orbit–dor. in S. L.	4.72–4.86 (4.80)	5.04–5.52 (5.24)	5.00–5.73 (5.33)
Dor. base in Sn.–dor.	1.52–1.62 (1.57)	1.78–2.01 (1.90)	1.38–1.60 (1.51)
Dor.–ad. in Sn.–dor.	?	2.02–2.22 (2.10)	2.03–2.34 (2.15)
Ad. spine in Dor.–ad.	3.30–4.11 (3.76)	2.14–2.37 (2.29)	1.88–2.24 ⑨ (2.08) ⑧
Dor. spine in Sn.–dor.	1.50 ①	1.48–1.77 (1.63)	1.24–1.42 (1.34)
Last dor. ray in Sn.–dor.	—	2.96–3.31 (3.14)	2.38–3.14 (2.73)
Pect. spine in Sn.–dor.	1.29–1.37 ③	1.48–1.56 (1.51)	1.30–1.47 (1.38)
Vent. spine in Sn.–dor.	1.35–1.79 (1.64)	1.75–1.86 (1.80)	1.48–1.74 (1.62)
D. of Caud. P. in L. of Caud. P.	3.55–4.66 (3.89)	3.26–3.62 (3.48)	2.96–3.59 (3.28)
Teeth	25–29 ②	38–47 (42)	45–66 ⑧ (55) ②
	29–32 ③	36–42 (39)	44–59 ⑤ (54) ⑨
Scutes	28 ② –29 ③	26 ① –27 ④	27 ⑧ –28 ②

E. N. de Miranda, April 17, 1945 (M. N. 4274); 10 specimens, 65-137 mm S. L., coll. Rio Paquequer, State of Rio de Janeiro, by A. Carvalho (M. N. 936); 11 specimens, 80-215 mm S. L., coll. Ilha das Pombas, Minas Gerais, by W. Gosline, Jan. 12-14, 1945 (M. N. 4275).

Measurement ratios and counts for this form are given in Table XIV.

This form is somewhat more depressed than the average *Plecostomus*. Caudal peduncle slightly flattened below. Supraorbitals slightly or imperceptibly raised. Supraoccipital bordered by three rather symmetrical scutes in all specimens examined. Barbel length equal to about 1/2 an eye diameter. None of the scutes carinate, but with minute prickles lined up in horizontal rows. Abdomen largely naked in specimens under 155 mm in S. L., plated except at ventral bases in larger Ilha das Pombas specimens. Pectoral spines without well-developed hooks even in largest specimens at hand. Pectoral reaching 1/3-1/2 of the way along ventrals, which reach about to base of last anal ray. Caudal not deeply concave, the shortest ray about 2/3 the length of the longest, which is about equal to head.

The general color of this fish is gray green. The pattern is usually one of more or less dark spots surrounded by lighter areas. The spots on the head, pectorals, and ventrals are so small and close together as to leave a reticulated pattern formed by the intervening light areas. There seems to be one small spot per dermal platelet covering the snout area. The reticulated pattern breaks up at times on the pectorals and ventrals to form wavy light lines. On the rear of body and dorsal the dark spots are larger and more indefinite, fading out completely at times. At other times the two rows of spots on each dorsal interradial membrane tend to merge, forming wavy cross-bars. The caudal is usually more or less plain, as is the abdomen.

Provisional Key to the Southeastern Brazilian Species of Plecostomus

1ª. Ventral spines longer than or equal to the pectoral spines (slightly shorter in 2 out of 32 specimens), longer than dorsal spine; eye contained 8.2 or more times in head, 6 or more times in snout in specimens over 150 mm in standard length; head and body blackish with light markings.

1. P. albopunctatus

1ᵇ. Pectoral spines longer than ventral spines.

2ª. Supraoccipital bordered posteriorly by a single scute, which is occasionally more or less subdivided into two or three unsymmetrical parts; lateral scutes 29 or fewer.

3ª. Depth of caudal peduncle contained fewer than 3.7 times in its length.

4ª. Scutes little or not carinate; mandibular ramus contained fewer than 2.9 times in the interorbital; head, body, and fins usually with light spots or markings.

5ª. Lateral scutes 25–27.

6ª. Body short and deep, its depth contained 4.5 or fewer times in the standard length; adipose spine contained 1.5 or fewer times in the dorsal-adipose distance; depth of caudal peduncle contained 2.5 or fewer times in its length.

2. P. latirostris & 3. P. ternetzi

6ᵇ. Body not unusually short and deep, its depth contained more than 4.5 times in the standard length.

7ª. Dorsal spine short, contained 1.7 or more times in the snout-dorsal distance; abdomen in adult incompletely plated.

4. P. paulinus

7ᵇ. Dorsal spine contained fewer than 1.7 times in the snout-dorsal distance.

8ª. Dorsal spine slightly shorter than or about equal to the head length, contained more than 1.3 times in the snout-dorsal distance.

9ª. Belly never completely plated, the abdominal platelets comparatively large and irregular, forming first along the bases of the lateral scutes and always leaving a wide naked area around the ventral bases

5. P. myersi

9ᵇ. Belly almost completely plated in specimens over 200 mm in standard length, the platelets small and regular, those of the central area of the chest forming at least as soon as those along the bases of the lateral scutes.

10ª. Mandibular ramus contained 1.9 or fewer times in the interorbital, usually 1.75 or fewer times; teeth on one side of either jaw 45–85 in specimens examined, usually 50–65.

11ª. Eye contained 6.8 or fewer times in head; dorsal spine about equal to head.

6. P. auroguttatus & 7. P. strigaticeps

11ᵇ. Eye 7.2 or more times in head in specimens over 130 mm in standard length; dorsal spine contained 1.9 or more times in head.

8. P. asperatus

10[b]. Mandibular ramus contained 1.8 or more times in interorbital; teeth 19–50 on one side of either jaw in specimens examined.
12[a]. Depth of caudal peduncle contained more than 3 times in its length.
13[a]. Eye contained fewer than 6 times in the head in specimens less than 250 mm in standard length.

9. P. macrops (see also 17[b])

13[b]. Eye contained more than 6 times in the head in specimens over 130 mm in standard length.
14[a]. Mandibular ramus contained 1.8 times in interorbital (Regan).

10. P. goyazensis

14[b]. Mandibular ramus contained 2.1-2.5 times in interorbital.

11. P. variipictus

12[b]. Depth of caudal peduncle contained fewer than 3 times in its length.
15[a]. Depth contained 6 times in standard length; interorbital contained more than 3 times in the head (Regan).

12. P. garmani

15[b]. Depth contained 5.5 or fewer times in the standard length.
16[a]. Interorbital contained 2.5 times, eye 6.25 times in head in a specimen 150 mm in total length (Regan).

13. P. iheringii

16[b]. Interorbital contained 2.6 or more times in head,
17[a]. Interorbital very slightly, but evenly convex. without ridges; caudal not deeply concave, the shortest ray more than 3/5 the length of the longest.

14. P. hermanni & 15. P. unae

17[b]. Interorbital with 3 distinct ridges, one central and two caused by the raised orbital rims; caudal somewhat lunate, the central rays about 1/2 as long as the longest.

9. P. macrops (see also 13[a])

8[b]. Dorsal spine greater than head length, contained 1.3 or fewer times in snout-dorsal distance; mandibular ramus contained 2 or more times in the interorbital.
18[a]. Depth of caudal peduncle contained 2.9 or fewer times in its length.

16. P. margaritifer

18[b]. Depth of caudal peduncle contained about 3.3 times in its length.

17. P. francisci

5[b]. Lateral scutes 27-29; length of dorsal spine about equal to its distance from tip of snout.
19[a]. Mandibular ramus contained about 2.8 times in interorbital (Regan).

18. P. alatus

19[b] (see 19[c]). Mandibular ramus about 2 times in interorbital.

19. P. regani

19[c]. Mandibular ramus about 1.5 times in interorbital (Devincenzi & Teague).

20. P. luteomaculatus

4[b]. Upper and anterior scutes carinate; mandibular ramus contained about 3 times in the interorbital; head, body, and fins with dark markings.

21. P. plecostomus

3[b]. Depth of caudal peduncle contained 3.6 or more times in its length (occasionally 3.5 times in *P. commersonii*); scutes 27-30; dark spots or markings on head, body, and fins.

22. P. commersonii and related forms

2[b]. Supraoccipital bordered posteriorly by a central scute and by one or more small scutes at each side (lateral scutes said sometimes to be absent in *P. wuchereri* and *P. ancistroides*); body usually with dark markings.
20[a]. Lateral scutes 30 or more; supraoccipital bordered by 4 or more scutes.
21[a]. Interorbital contained 2 2/5 times in the head (Regan).

23. P. rachovii

21[b]. Interorbital contained 2 2/3 or more times in the head (Eigenmann, et al).

24. P. laplatae

20[b]. Lateral scutes 26–28.

25. P. wuchereri and related forms

PLATE I

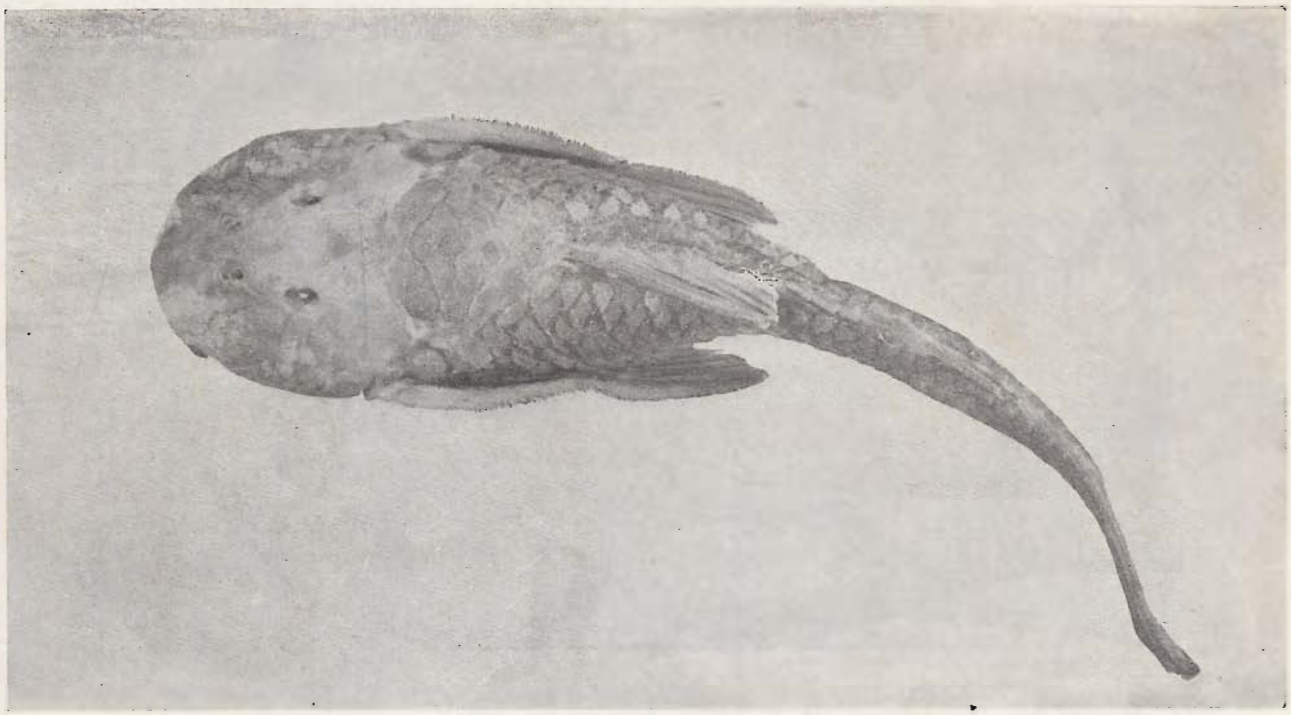


Fig. 1

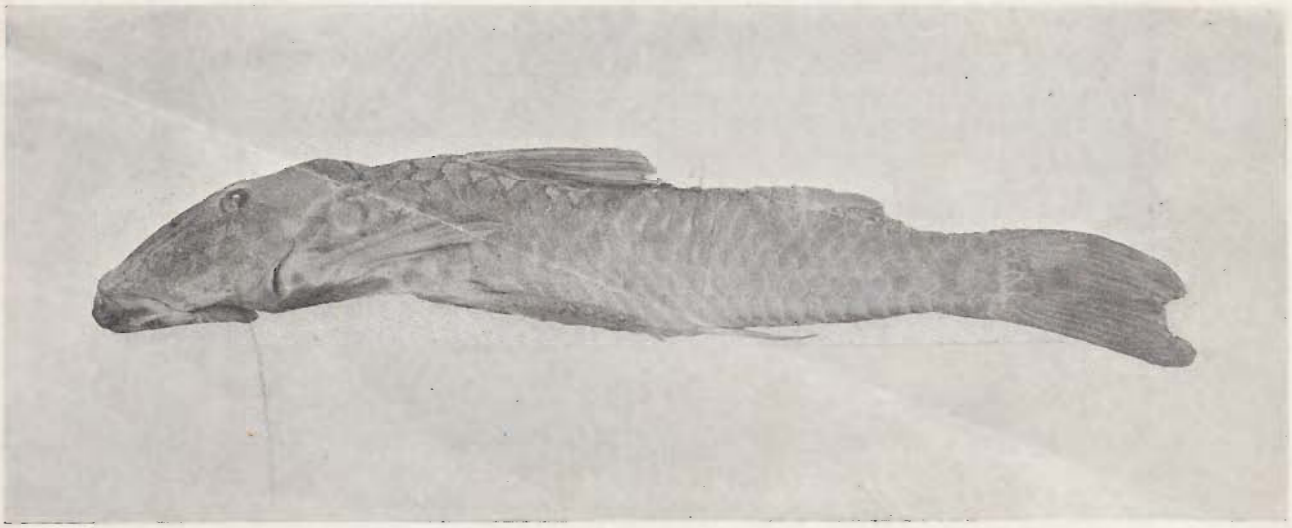


Fig. 2

Plate I. *Upsilodus victori,* holotype, 127 mm in total length. A museum-worn specimen which has been tied to a piece of glass just before and behind dorsal. Fig. 1. Dorsal view. Fig. 2. Lateral view. (Photos by Moacir Leão).

PLATE II

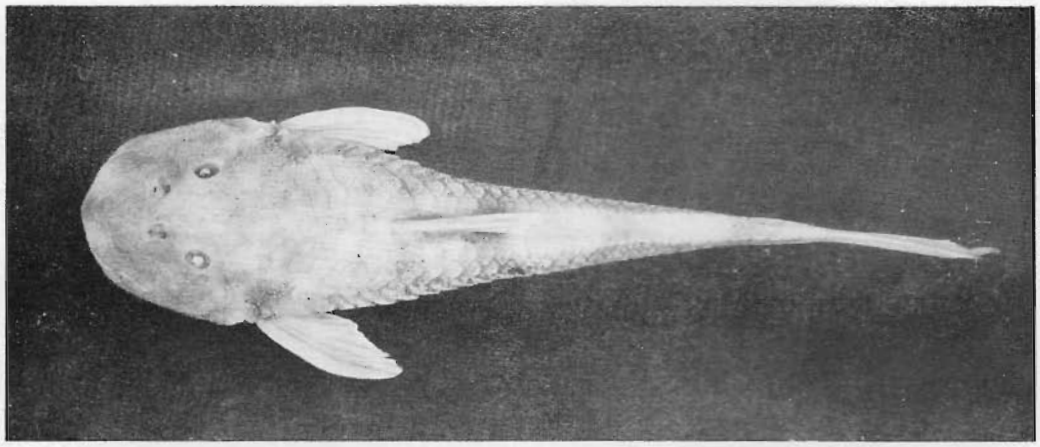


Fig. 3

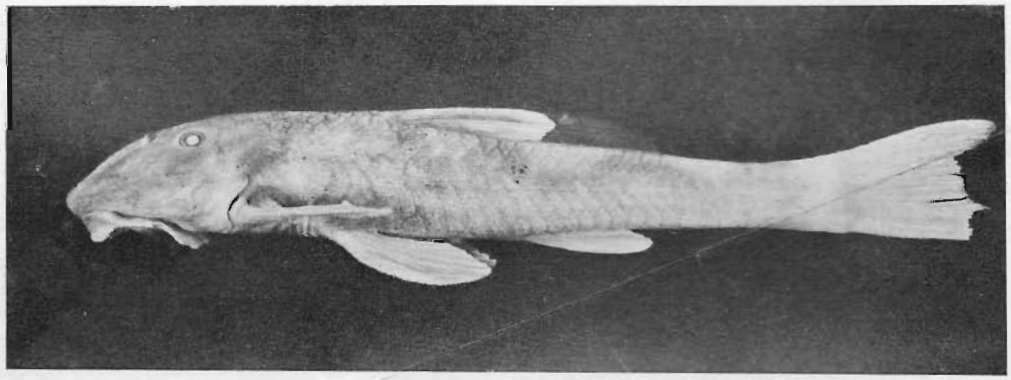


Fig. 4

Plate II. *Pareiorhina rudolphi*, from a specimen 56 mm in total length. Fig. 3. Dorsal view. Fig. 4. Lateral view. (Photos by Moacir Leão).

PLATE III

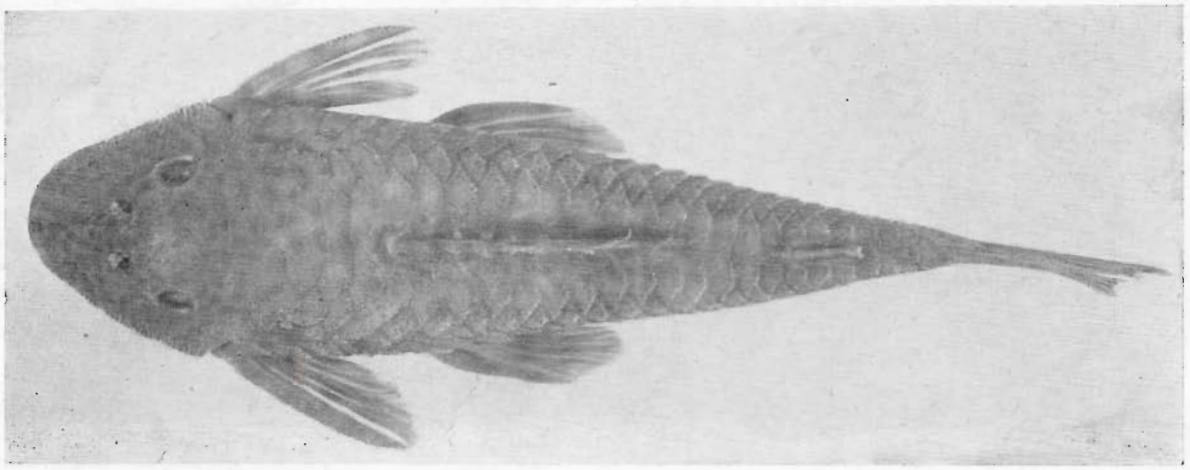


Fig. 5

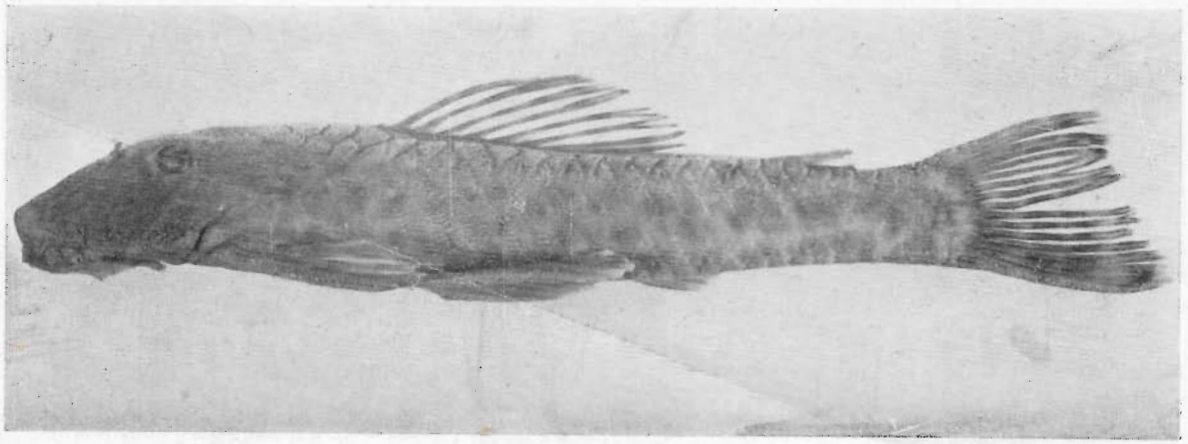


Fig. 6

Plate III. *Corymbophanes bahianus*, holotype, 98 mm in total length. Fig. 5. Dorsal view. The fine bristles on the side of the cheek are difficult to see because of the light background. Fig. 6. Lateral view. (Photos by Moacir Leão).

PLATE IV

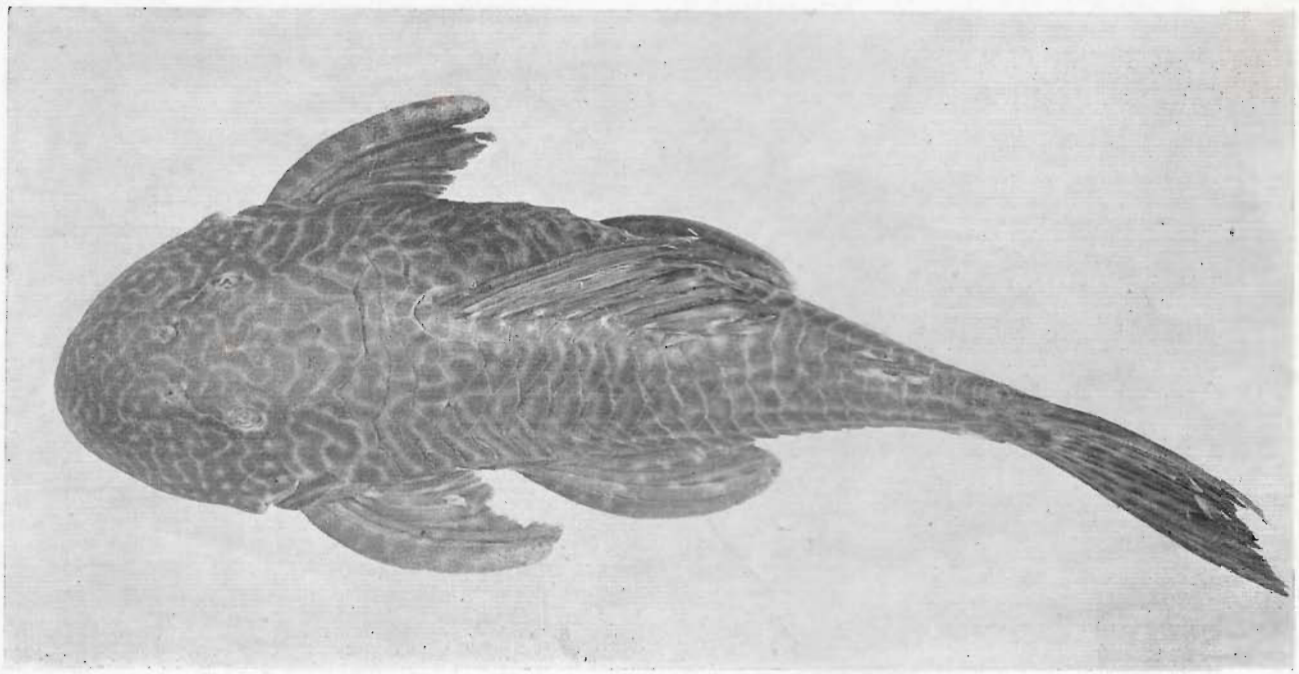


Fig. 7

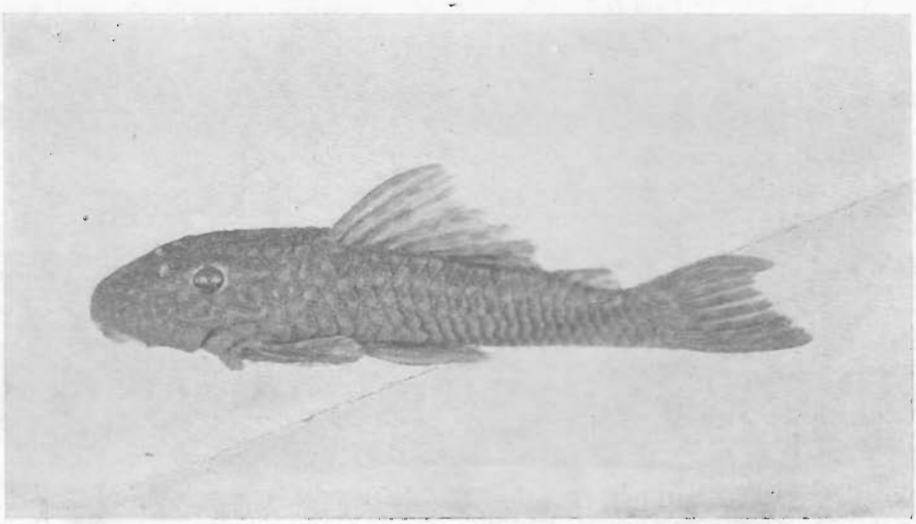


Fig. 8

Plate IV. Fig. 7. *Plecostomus albopunctatus*, dorsal view of a specimen from the Rio Piracicaba 209 mm in standard length. This particular specimen shows a reticulated rather than a spotted pattern.

Fig. 8. *Plecostomus paulinus*, superolateral view of a specimen 117 mm in standard length from the Rio Piracicaba. (Photos by Moacir Leão).

PLATE V

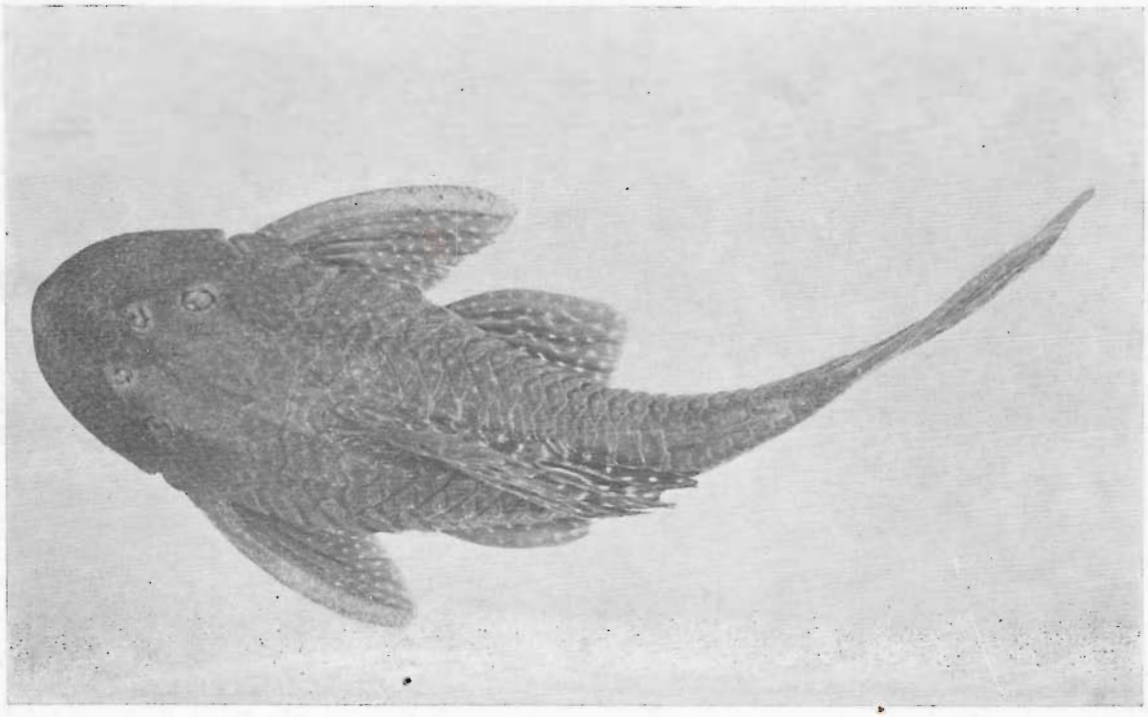


Fig. 9

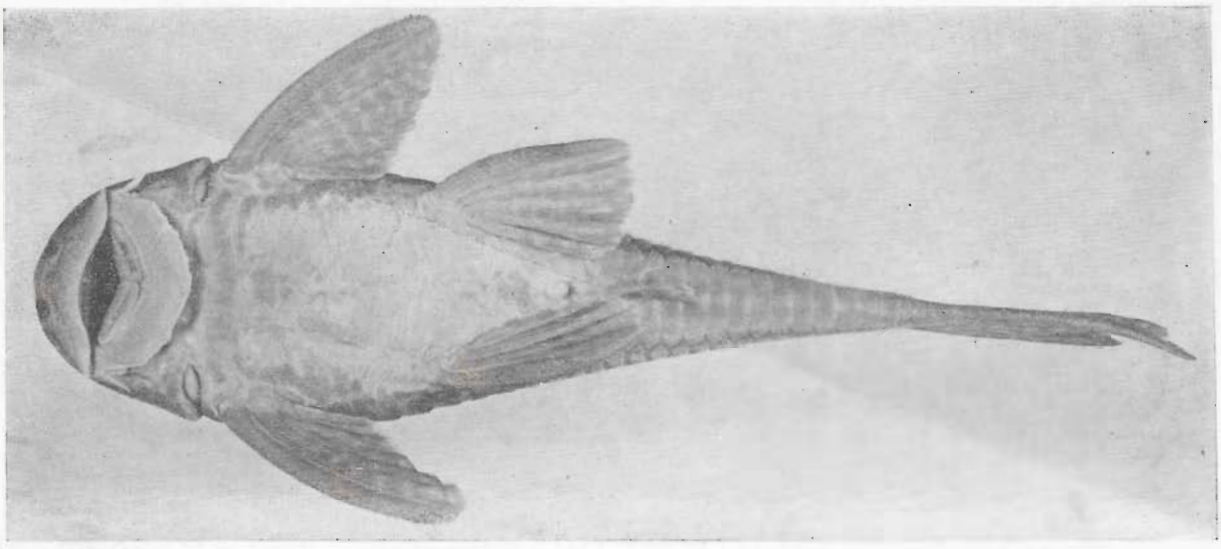


Fig. 10

Plate V. *Plecostomus myersi*. Fig. 9. Holotype, 182 mm in standard length. from above. Fig. 10. Ventral view of a specimen 139 mm in standard length. (Photos by Moacir Leão).

PLATE VI

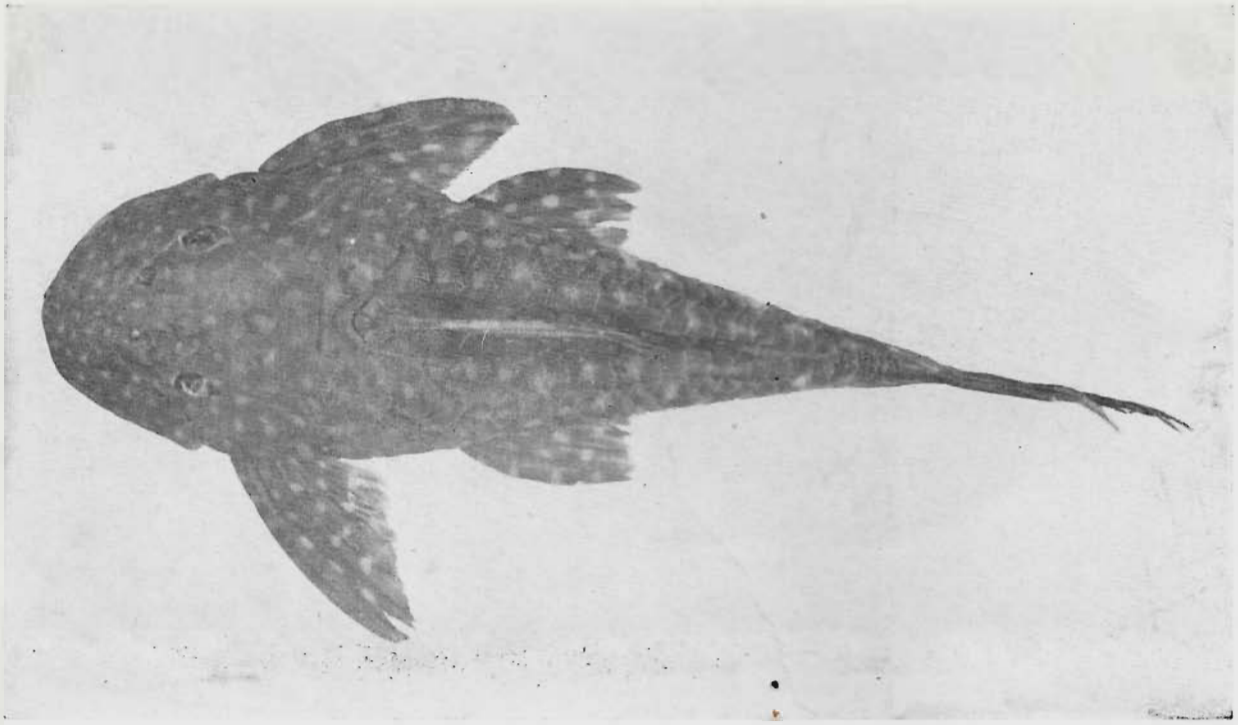


Fig. 11

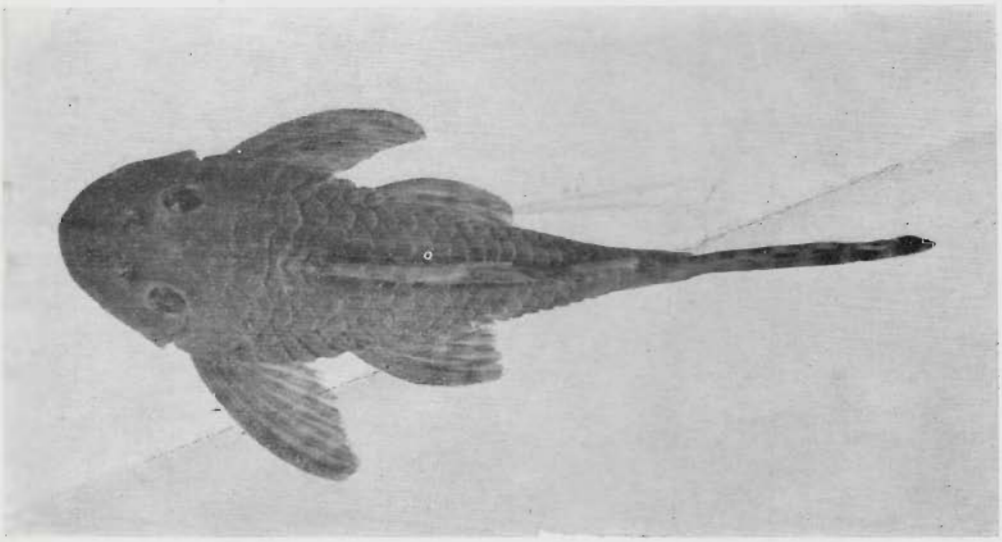


Fig. 12

Plate VI. Fig. 11. *Plecostomus strigaticeps*, dorsal view of a specimen in a boldly spotted phase 164 mm in standard length from the Rio Mogi-Guaçu.

Fig. 12. *Plecostomus macrops* (?), form *a*. 103 mm in standard length, dorsal view, from Rio Mogi-Guaçu. (Photos by Moacir Leão).

PLATE VII

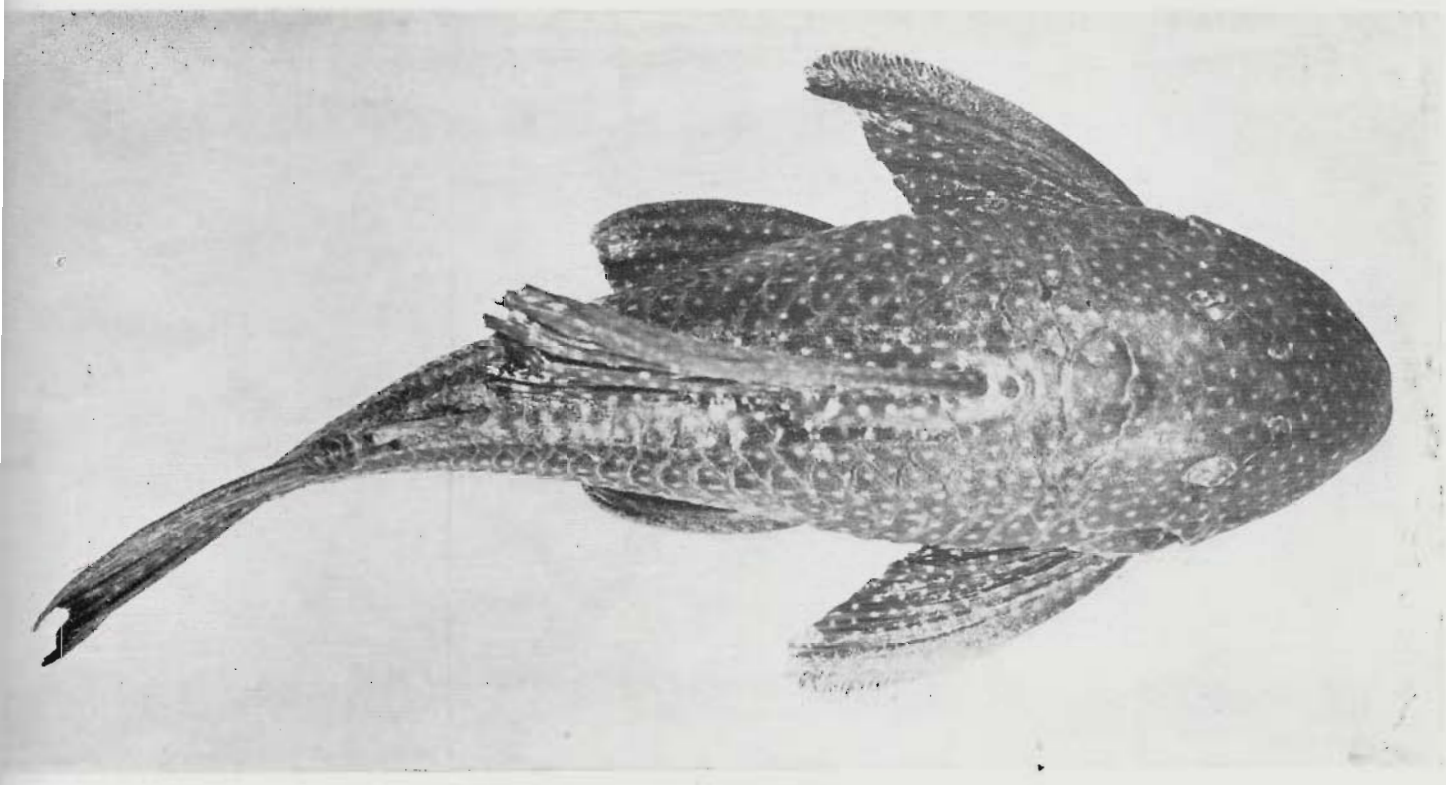


Fig. 13

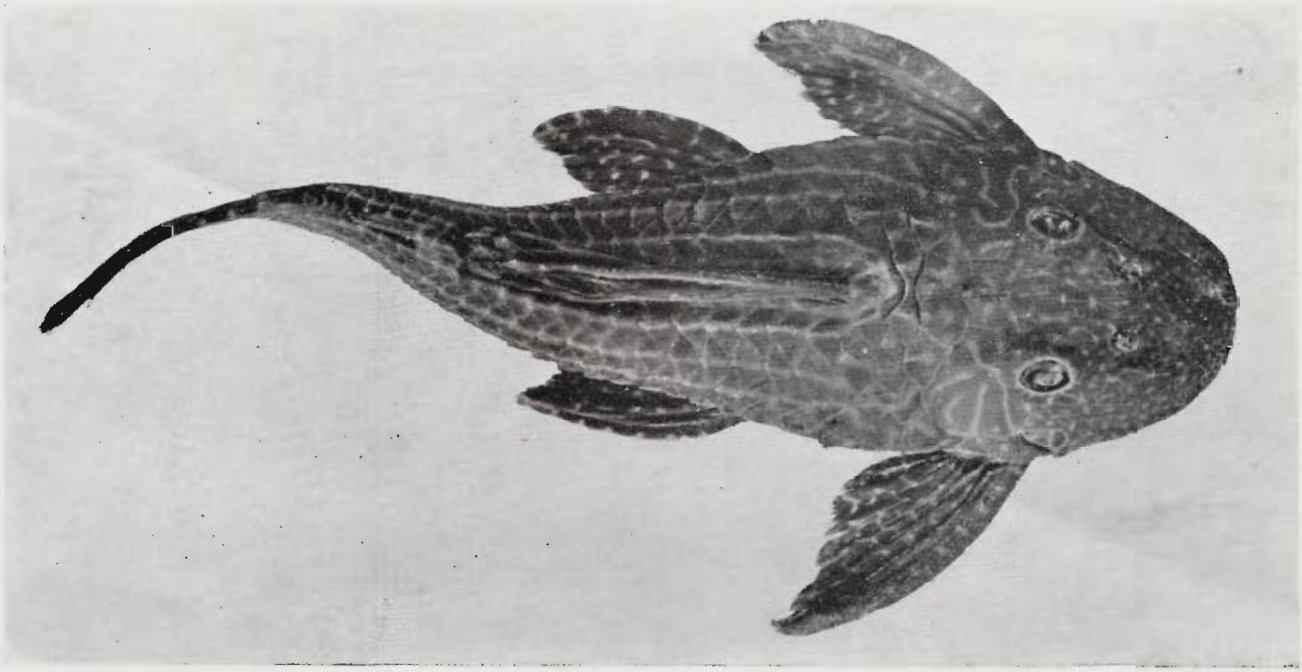


Fig. 14

Plate VII. *Plecostomus margaritifer* (?) from the Rio Mogi-Guaçu. Fig. 13. Form *a*, dorsal view, from a specimen 310 mm in standard length. Fig. 14. Form *b*, dorsal view, from a specimen 225 mm in standard length. (Photos by Moacir Leão).

PLATE VIII

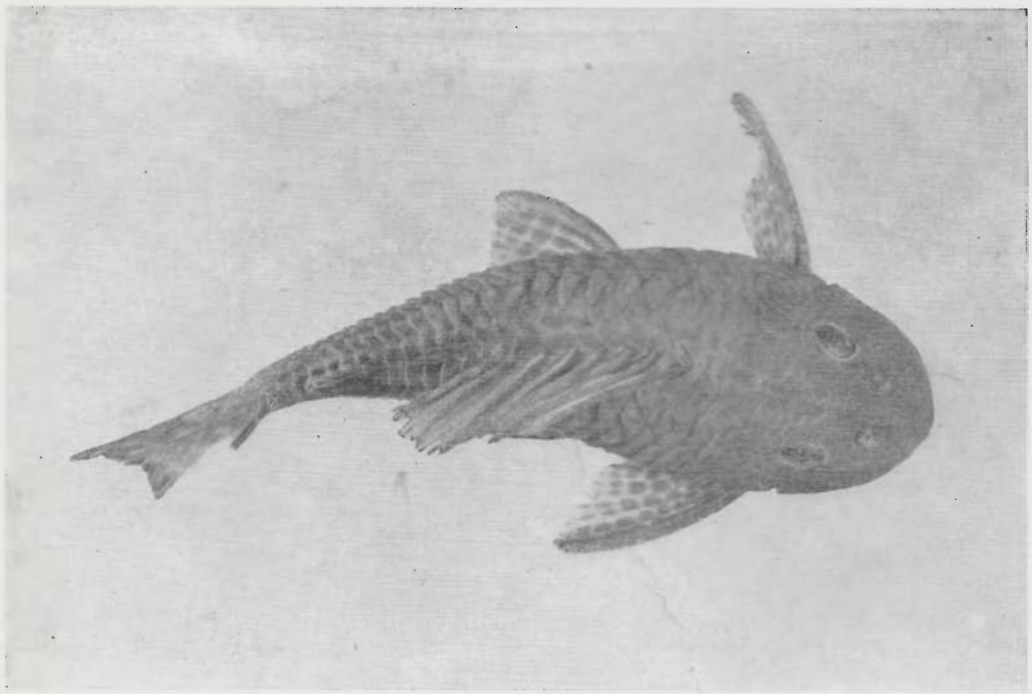


Fig. 15

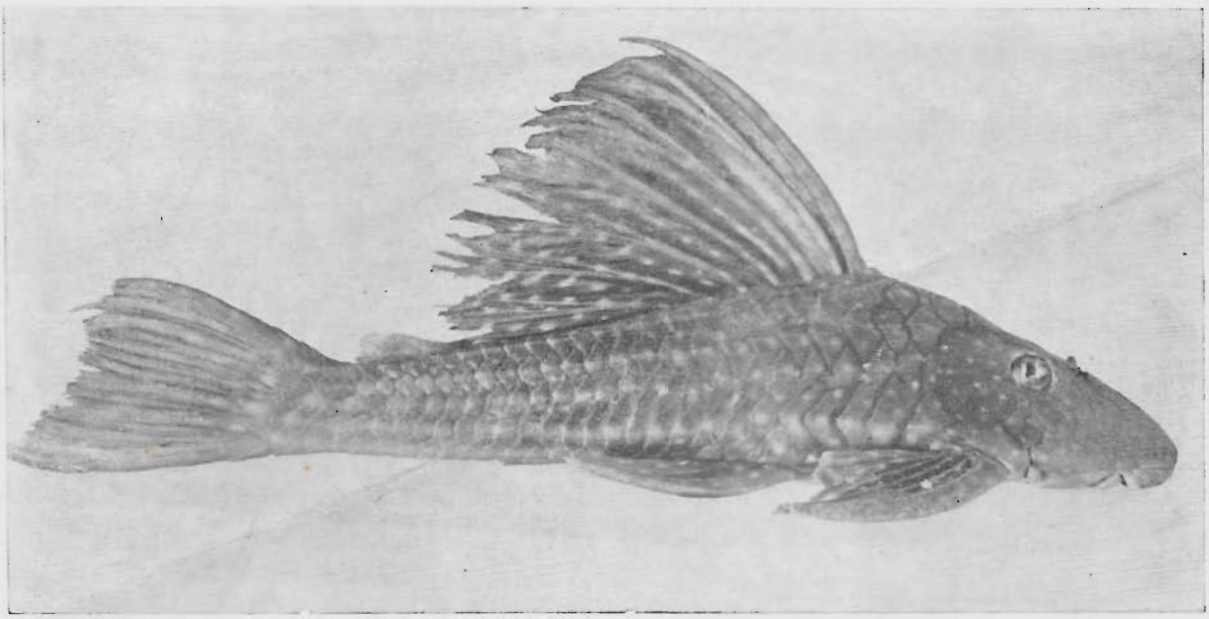


Fig. 16

Plate VIII. Fig. 15. *Plecostomus hermanni*, dorsal view of a specimen 147 mm in standard length from the Mogi-Guaçu, showing reticulated phase.

Fig. 16. *Plecostomus regani*, lateral view of a specimen 240 mm in standard length from the Rio Mogi-Guaçu. (Photos by Moacir Leão).

PLATE IX

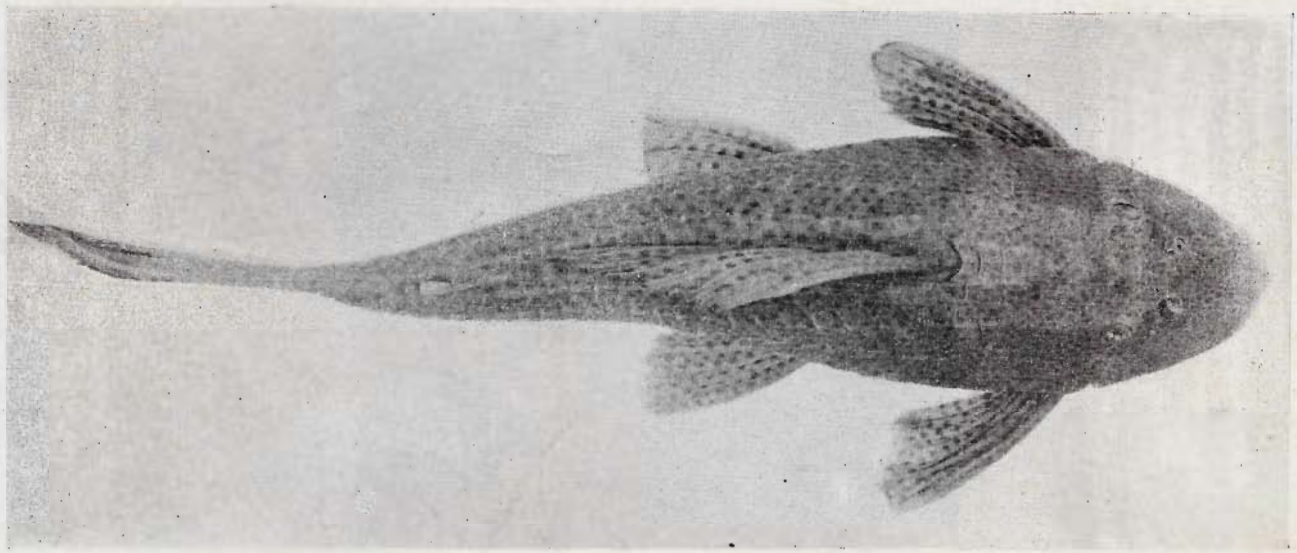


Fig. 17

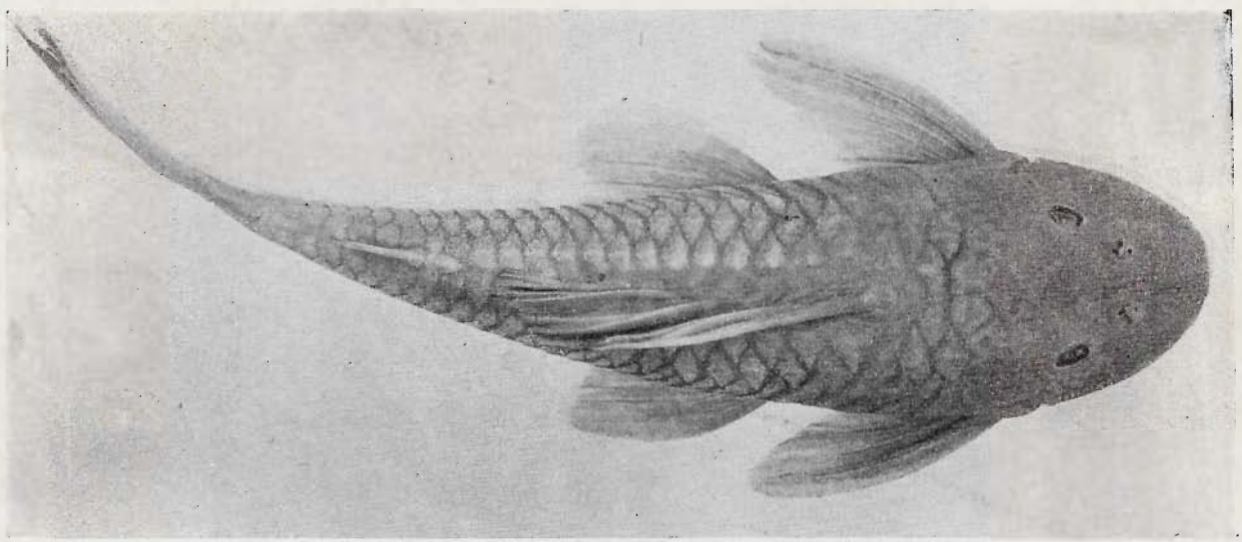


Fig. 18

Plate IX. Fig. 17. *Plecostomus punctatus*, dorsal view of a specimen 181 mm in standard length from the Rio Paraíba do Sul.

Fig. 18. *Plecostomus lütkeni*, dorsal view of a specimen 155 mm in standard length from the Rio Paraíba do Sul. The lateral scutes at each side of the more or less divided central scute do not show well. (Photos by Moacir Leão).